Contents for April 1961

SPECIAL CORN GROWERS ANNUAL ISSUE

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Corn Borer Activity Depends on Weather

If you are concerned about Mr. Corn Borer's 1961 plans, better keep an eye on the weather. Whether or not this damaging insect causes trouble depends entirely on weather conditions and farming practices.

H. B. Petty, extension entomologist with the University of Illinois reports that certain weather conditions can wipe out borers almost overnight. The following conditions, however, help borers to grow and multiply: (1) cool weather until corn planting time, (2) a mild summer, (3) average or above-average rainfall and (4) calm weather during the corn borer moth flight in June.

Certain farming practices help to control corn borers. Clean plowing, thorough shredding of stalks that are not plowed under, and use of adapted hybrids are three examples.

A recent count showed a smaller than average number of borers spending the winter in mid-west cornfields. This trend has continued for the past four years. Insect specialists are not sure, however, whether this decrease means that the borers have reached the low point in their current population trend. If they have, their numbers might increase this year.

All farmers should keep a sharp watch on early-developing cornfields.

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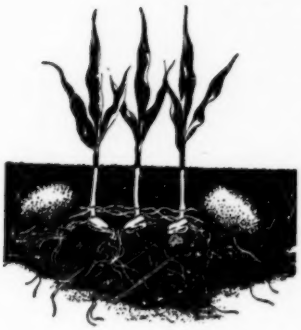
What's Ahead For Corn?



It may not be far off when yields of 200 bushels per acre will be the goal of every farm. To make money, farmers must use the latest and best practices to save labor and get more from their land . . .

Condensed from
Ohio Farm and Home Research

D. M. Van Doren and *J. B. Jones*

MAJOR changes in the methods of corn culture are coming fast.

The trend is to fewer field operations for seedbed preparation and cultivation. Present row spacings of 40 to 42 inches may be narrowed considerably. With narrower rows, combine harvesting will replace the row pickers. With the introduction of higher yielding hybrids, you will produce more corn per acre.

All of these changes will not occur within the next few years. At the present time some of the cultural practices proposed here (particularly minimum tillage) are being experimented with, tried, and adopted by many farmers.

Minimum Tillage

Plowing will probably remain the first order of business for the foreseeable future. However, seedbed preparation will be confined to a strip operation within the corn row. It is definitely known now that it is unnecessary to prepare a seedbed over the whole field to grow a good crop of corn. In fact, it is advantageous to leave all but the actual corn row as loose as possible for greater

Reprinted from Ohio Farm and Home Research, Ohio Experiment Station, Wooster, Ohio

moisture intake and better erosion control. There already exist many techniques of minimum tillage, including plow-plant, wheel track planting and strip processing.

Post-Planting Cultivation

One of the main purposes of cultivating corn is to control weeds. Soon we will have almost complete chemical weed control at a price which will make cultivation for weed control completely unnecessary. However, on some soils which have poor natural soil structure, cultivation will be necessary to break soil crusts. Thus it will be the tilth of the soil, not weeds, which will determine the necessity for post-planting cultivation.

Reducing the corn row width to 26 inches or less primarily distributes the plant more evenly over the field. The result is a more complete utilization of soil nutrients and water. In addition, an even leaf canopy is obtained early in the season, providing shade for weed control and reducing the impact of heavy rains and sunlight on the soil surface.

A bushel of shucked ear corn contains about 11 pounds of cob.

Narrow row corn tends to outyield conventionally (40-42 inches) planted corn. Further tests with narrow row corn will be necessary to determine the practicality of various harvesting techniques. This will complete the data needed to make the narrower rows a recommended practice. A similar trend is taking place for soybeans and sugarbeets.

No major changes are expected in fertilizer recommendations for corn. Some increase in the nitrogen recommendations will probably be made, particularly when corn is grown in continuous culture or in a non-legume rotation. Trace element deficiencies may occur in some areas which will require corrective measures. However, these deficient areas probably will not be widespread and may only occur under unusual circumstances.

In addition to soil tests, tissue tests will be used to evaluate fertilizer needs particularly for the trace elements. In order to save time and handling, more fertilizer will be applied in bulk with less being applied in the row. In some areas, in-the-row fertilization probably will be discontinued.

Rotational Practices Changing

Large acreages in Ohio and other states are now either in continuous corn or permanent pasture with the trend toward mono-culture agriculture. Many soils of northwestern Ohio and many bottom and river bed areas are suitable for continuous corn culture. These soils can be and

will be farmed intensively with less acreages being devoted to rotation farming.

Improved Hybrids

Significant yield increases will come with higher yielding hybrids. Hybrids having disease resistance, multiple ear tendencies which do not go barren at high populations, and are better adapted to the climatic characteristics of their recommended area will significantly increase the yield potential. These hybrids probably will be more specific and less adapted to a wide range of conditions. However, such hybrids will be a long time in coming. A twenty to thirty year period from genetic nursery to a farmer's field is not unusual.

With the advent of narrow row planted corn, new machinery will be needed for harvesting. Combining corn probably will be a more ideal way to harvest the narrow rows of corn than harvesting by the row. This same piece of equipment would be interchangeable for other grain crops, providing a major reduction in capital expense for machinery. Shelling in the field will probably be more widely used, giving less bulk for storage and handling.

Yield Increases Coming.

Some of the changes in corn culture will not necessarily result in large yield increases. Although some yield advantage can be gained from minimum tillage, this practice will be adopted mainly to reduce the cost in time and labor for seedbed preparation. Significant yield increases will come with newer hybrids. A change in row spacing along with new hybrids probably will increase plant population recommendattions. At the present time, yields of 100 bushels or more are not uncommon. It may not be far off when yields of 200 bushels will be the goal for every farmer.

Mulches Cut Cornfield Erosion

Mulches will reduce soil erosion in cornfields without cutting corn yields, USDA research indicates. Studies have shown corn yields about the same for both mulch culture and conventional tillage — but where mulch was used the erosion and runoff were reduced and water infiltration into the soil was increased.

The research showed a three-year average corn yield of 77 bushels per acre for all tests, with yields in excess of 100 bushels per acre for the best crop year and fertilizer treatment. Yields for the different treatments were about the same, but slightly in favor of the mulches — about two bushels per acre. —*Tuesday Letter*

What About Continuous Corn?

Interest in continuous corn has been growing for several years. Here's a report on the results of Iowa tests . .

Condensed from Iowa Farm Science

W. D. Shrader, John Pesek, and *W. C. Moldenhauer,*

Iowa State University

CORN remains as one of our nation's most profitable major crops. And more and more corn growers are moving into a "corn-following-corn" or *continuous corn* cropping program. Both actual practice and experimental work have indicated that it's possible to get good corn yields when corn is grown continuously on *some* soils.

Continuous corn is most feasible on more or less level areas where erosion isn't a problem. But it's not now feasible to control erosion under continuous row-cropping on slopes of more than 5 percent. And, even on gentle slopes of only 2-5 percent, erosion can be controlled only with special practices.

Before we get into specifics, however, let's look briefly at some of the prospects for and implications of continuous corn. What does it or could it mean to farming?

Its Meaning . . .

Since corn is our most profitable major grain crop and since a shift to continuous corn permits an individual to increase his corn production, we can expect more and more farmers on nearly level soils to adopt the practice. On farms with both level and rolling land, a shift to continuous corn is likely on the level land and one to continuous meadow, pasture or rotation cropping on suitable rolling land.

On farms with only rolling land, there's likely to be little effect, unless farmers attempt to grow continuous corn on the rolling land. In this case, erosion damage will be increased.

Wisely used, this technique can

Reprinted from Iowa Farm Science, Iowa State College, Ames, Iowa

increase the relative wealth of corn growers. Used unwisely, it could result in accelerated erosion and in serious land deterioration.

Another problem we must recognize is that corn production in total already is in surplus. Continuous corn generally means more total production from a farm. And a large increase in total production from many farms could further depress corn prices. On the other hand is the fact that —because of nature—many individual farmers have an advantage over many of the other corn-producing areas in having a relatively high proportion of land suitable for continuous corn.

Interest in the possibility of continuous corn has been growing for a number of years, and an increasing number of farmers have been trying it out on their own. Here, now, are the specific results of experiments conducted in Iowa.

It Can Be Done

As shown in the table at the end of the article yields of continuous and of rotation corn have averaged about the same at six locations over the past 6 years. In another experiment at the Agronomy Farm near Ames, Iowa, one set of plots has been in continuous corn since 1915. When edequate fertilizer was applied, starting in 1952, yields on these old continuous corn plots shot up to levels as high as the rotation corn.

Use of 160 pounds of nitrogen and 60 pounds each of P-2, 0-5 and K-2, O per acre annually increased average corn yields from 41 to 92 bushels per acre in the 1953-59 period. Eighty pounds of nitrogen *with* P-2, O-5 and K-2, O gave 81 bushels, but the same amount of nitrogen *without* the other two nutrients yielded only 73 bushels. The most profitable annual rate of nitrogen in this experiment was about 120 pounds per acre. We estimate that a long-time annual rate of 30-40 pounds each of P-2, O-5 and K-2, O would be adequate to achieve these yields.

In the work with continuous corn at Ames, it was easy to push continuous corn yields to high levels. But, as shown in the table, this isn't always the case. Continuous corn yields at the Pasture Improvement Farm and at the Grundy-Shelby Farm have remained lower than yields of rotation corn. At the Albia location, it has taken several years to build up the fertility level on the depleted plots, and yields were up for the first time in 1959. In 1959 at Albia, rotation corn yields aver-

More than half the world's people earn less than $200 annually, are chronically undernourished, cannot read or write and cannot expect to live over 40.

aged 109 bushels per acre as compared with 102 bushels for continuous corn.

What Soils?

Most of our work with continuous corn has been on more or less level areas of medium-textured soils. Continuous cropping to corn or soybeans should not be attempted on moderate-to-steep sloping areas of more than 5-percent slope. It's not feasible to control erosion with commonly used cultivation practices.

On gentle slopes (2-5 percent) continuous cropping should be attempted only after careful thought and attention to the erosion hazard. Usually, at least contouring or terracing and contour cultivation are necessary practices. Again, the areas in which continuous row-cropping seems most feasible are the areas of nearly level medium-textured soils.

Fertilizer Needs . . .

The main feature of fertilizer needs for continuous corn is the need for additional nitrogen. About 80-120 pounds per acre annually would be needed if corn were grown continuously on soils of average fertility as found in Iowa. First-year corn following a good legume meadow requires little or no fertilizer nitrogen.

Because of the higher average value of product produced per acre, it's profitable to maintain a field in continuous corn at a higher level of fertility than a field in a rotation with oats and hay. Carry over residues of phosphorus and potassium fertilizers are relatively high, and different crops remove different amounts of these from the soil. We estimate that, over a period of years, a field of corn, if the stalks aren't removed, will use significantly less potassium and about the same amount or slightly less phosphorus than a field in a rotation with oats and hay.

Effects on Soil . . .

Many studies indicate that there usually has been a decline in soil organic matter and soil structure under intensive cultivation. Most of these studies, however, were made under conditions of low fertility. The rate of decline in organic matter and soil structure could be expected to be less when large amounts of organic residues are produced as is the case with correctly fertilized corn. And the limited amount of work that has been done under conditions of high fertility indicates that the organic matter level and soil tilth can be kept at satisfactory levels for crop production with continuous corn.

Artificial insemination of animals is an old practice. Records show Arab horsebreeders used the method around 1,300 A.D.

Water Use . . .

While there's not much differ-

ence in drouth hazard for rotation corn as compared with continuous corn, the hazard is slightly greater for rotation corn. This is because the growing corn must depend on soil or subsoil moisture supplies for periods of a week or longer nearly every season. And the chances of having a large soil moisture reserve are better following corn than following meadow.

Corn, for practical purposes, ceases using moisture during the last half of September. Water use by deep-rooted perennial legumes continues until they're plowed under or go dormant. And they resume water use in the spring if not plowed under.

The results of soil moisture studies in recent dry years indicate more available water in soils previously in corn than in soils previously in legume meadow. Thus, continuous corn would tend to reduce the year-to-year variations in corn yields that result from seasonal differences in rainfall.

Drainage . . .

Any benefits in drainage that may result from including a deep-rooted legume in a rotation are believed too slight or too limited in the soil conditions to which they apply to be of serious concern. There's much, however, that isn't known on this subject, and our studies are continuing.

Weeds, Insects, Diseases

Continuous corn wasn't feasible even on level land in many areas until soil insecticides were introduced to control soil insects attacking corn seed and roots. The use of modern chemicals and cultural practices permits weed, insect and disease control in either continuous or rotation corn. Some weeds and insects are easier to control in a rotation, while others may be easier to control with continuous corn.

Corn grown continuously "invites" a buildup of soil-borne diseases, and growers will have to remain alert for signs of damage.

Other Factors . . .

The growing of a single crop tends to concentrate the demand for labor and equipment and to increase the risk of financial loss in case of either crop failure or a low price for corn. On many farms, however, there may be an opportunity to increase the intensity of cropping on level land while decreasing effort and intensity on the more rolling portions of the farm. Such a shift could lower the costs of producing both

Purdue foresters say when poisonous plants begin to appear in farm woods, protect livestock by fencing them out of the woods. It is much more profitable to have livestock on legume pasture gaining weight, than in the farm woods losing weight.

corn and hay and would tend to overcome the risk we just mentioned. Total farm product could increase since the low-yielding oat crop would occur less frequently, if at all.

While the demand on equipment and labor would tend to be aggravated, the supply of equipment and labor talent wouldn't need to be as diverse. A corn farm, for example, wouldn't need a hay baler, a grain combine, etc. Money saved here might be put into more or larger equipment for corn production.

Relative 1953-1958 average yields of continuous and rotation corn at six Iowa locations.

	Average yield (bu./A.)		Yield of continuous corn
	Rotation corn	Continuous corn	as a percentage of rotation corn
Carrington-Clyde Farm, Independence			
Rotation experiment	98	99	101
Runoff experiment	102	97	95
Soil Conservation Farm, Clarinda	75	77	102
Pasture Improvement Farm, Albia	72	58	81
Southern Iowa Farm, Bloomfield	96	105	110
Seymour-Shelby Farm, Seymour	76	80	105
Grundy-Shelby Farm, Beaconsfield	78	71	92
AVERAGE	85	84	98

Prize Corn

The story is told of the Indiana farmer whose prize corn won the blue ribbon at the state fair year after year. One day an enterprising newspaper reporter made an interesting discovery while interviewing the farmer after he had just been awarded another blue ribbon. He learned that for many years it had been the practice of the champion corn grower to share his best seed corn each year with his neighboring farmers.

"How in the world can you afford to share your very best seed corn with your neighbors?" asked the reporter. "They are entering corn in competition with yours in this fair each year. Yet you are helping them by sharing your prize seed with them."

Said the man who had won the blue ribbons: "Why, sir, don't you know that if I want to grow good corn, I must help and encourage my neighbors to grow good corn? Don't you know that the wind picks up the pollen from the ripening corn and swirls it from field to field? Don't you know that if my neighbors grow inferior corn, cross-pollination will steadily degrade the quality of my own corn? If I want to grow good corn, I must help my neighbors grow good corn, too."

—*Sunshine Magazine*

How Deep Planting Reduces Corn Yield

Deep planting doesn't mean deep permanent roots. Roots growing from the kernel of seed are only temporary . . .

Condensed from Wallaces Farmer

THREE conditions are essential to good germination of your seed corn. They are sufficient air, adequate moisture, and a warm soil temperature.

This puts top priority on planting date and planting depth. Soil air, moisture, and temperature are closely geared to these two "operator" decisions.

There's little doubt about when to plant. Check corn maturity recommendations for your area if you don't know. Your seed dealer, county agent, or vocational agriculture instructor can supply this information.

But when it comes to the question of planting depth, you find a variety of opinion.

Some folks believe that deep planting means deep roots. They-'ll sink the planter 4 or 5 inches into the seedbed thinking this builds a deeper, stronger root system.

Truth of the matter is that this won't make any difference on root depth. It's apt to add to planting costs though — fuel and power requirements go up as draft increases.

Actually, those roots which grow directly from the kernel of seed are just temporary. Their only purpose is to aid in getting the seed started.

A corn plant's permanent roots grow out from the stalk at nodes just below the surface of the soil. These roots are established at approximately the same depth no matter if the kernel is planted one inch or 5 inches deep. So don't count on deep planting to give a deeper rooted corn plant.

Then what is the right depth? There is no cut and dried answer. Planting depth will vary with soil type and texture, soil moisture and soil temperature.

Protecting the seed against birds or rodents, and surface drying rules out extremely shallow planting.

By the same token, don't ex-

Reprinted by permission from Wallaces Farmer, 1912 Grand Avenue, Des Moines 5, Iowa

pect a kernel to push its sprout up thru more than 4 inches of soil before it gets strength from the sunshine.

Basically this means planting at a depth that gives good contact with moist soil, but no deeper.

Polk county, Iowa, farmer R. C. Butin puts it this way, "If there's enough moisture in the soil, you can get by barely covering the seed—just one to 1½ inches will do. If the soil is dry, I plant deeper—around 3 inches would be about average."

A good stand and high yields are important to Dallas county, Iowa, farmer Joe Paul. He's planting 117 acres of corn on his quarter section farm—needs this high corn acreage for raising 700 hogs plus feeding some beef cattle.

You can get more silage from summer annuals, such as corn, sorghum, sudangrass, and millets, than from perennial legumes or grasses. Research at the Pennsylvania Station produced 12.7 to 23.9 tons per acre on a 70 per cent moisture basis.

He feels planting at the right depth has a lot to do with the stand you get. "So I plant just deep enough to drop the seed kernels in moist soil," he says.

Field trials show that in heavier soils with adequate moisture, planting one to 1½ inches deep is okay. But in light, sandy soils, a 2 to 3-inch depth gives better germination.

Agronomists point out that, because soil warms and dries from the top down, the preferred planting depth often increases as the planting season advances. You may want to move from a one or 2-inch planting depth the first couple of days to 2½ or 3 inches during the latter part of the planting season.

Soil temperature varies with soil depth too. Noon soil temperatures are likely to be about 5 degrees higher at a 2-inch depth than they are at a depth of 4 inches. This slight temperature variation can mean the difference between a growing or rotting seed.

So planting seed corn only deep enough to obtain sufficient soil moisture seems to be your best guide. Table below shows results of planting depth and effect on stand and yield.

Planting depth	*Stand*	*Yield (bushels)*
1 inch	94%	66.0
2	92%	51.6
3	85%	47.0
4	82%	45.2
5	58%	44.4

How To Adjust Your Corn Planter

Here are some tips to get you off to a good start . . .

Condensed from
Wisconsin Agriculturist

NOW'S the time to start planning that big corn yield.

Big yields don't just happen. It takes high levels of soil fertility and the right plant population to make the most of each corn acre.

University of Wisconsin figures show that deep loam and muck soils yield between 90 and 120 bushels per acre. Recommended plant population on these soils is 16,000 to 18,000 plants per acre.

Shallow silt loams and sandy loams can produce 60 to 90 bushels per acre with populations of 13,000 to 15,000 plants per acre.

Light Yields on Sand

Soils that are very sandy and very shallow generally yield 40 to 60 bushels with populations of 10,000 to 12,000 plants per acre.

After deciding on the desired plant population, add 10 percent to the number of kernels to plant per acre. This allows for those that don't germinate.

Some seed dealers furnish information on plate size with each bag or lot of seed corn. But whether or not this information is furnished, it pays to check out the planter to see just how many kernels it drops.

Seeds can be planted almost any distance apart when drilling. The seed plate determines the drilling distance. A manual with the planter tells what settings to use. If you've lost your manual, a few minutes experimenting with various settings will give desired adjustment.

You can test drill planting rates by dropping the openers on a hard surface and driving at the speed to be used in the field. This will leave the kernels on a surface where they are easily counted. Count the kernels dropped in a 50 foot distance to get an average.

Since 50 feet is 600 inches, divide the number of kernels in 50 feet into 600 to get the spacing in inches. For example: 65 kernels in 600 inches (600 divided by 65 equals 9.2 inches spacing). See table below for drill row spacing.

To test the accuracy of hill dropping, jack up the planter, fill the hoppers and turn the wheels.

Reprinted by permission from Wisconsin Agriculturist, Racine, Wisconsin

Trip the check-forks by hand and catch the seed, keeping accurate check on each dropping. Don't turn the planter faster than 35 revolutions per minute.

Check-rowing must be accurate or cross cultivation will be impossible. Proper adjustment of the check wire is the most important factor in accurate checking.

Dig up a Row

To find out if the planter is giving a good cross check, dig up a row of at least eight hills crosswise.

Crooked cross rows may result from wrong tension on the check wire or running the front end of the planter too low. One side out of check may be caused by a bent planter frame or a weak spring. Scattered seed between hills may indicate kinks in the check wire.

Speeds of 3 miles per hour are best for planting. Faster speeds may cause missing or bunching of seed.

Before you go to the field, go over the whole planter. Replace the furrow openers if they are worn. Worn openers cause improper planting depths.

Fill the gear cases to proper level with number 20 oil. Keep other parts lubricated during planting.

KERNEL SPACING FOR DRILL ROWS

Plants per acre	Kernels per acre	36 inch row	38 inch row	40 inch row	42 inch row
12,000	13,300	13.1	12.4	11.8	11.2
14,000	15,500	11.2	10.6	10.1	9.6
16,000	17,800	9.8	9.3	8.8	8.4
18,000	20,000	8.7	8.3	7.8	7.4

Making Better Silage

Almost 10 per cent more dry matter can be recovered in silage made from finely chopped and bruised forage than from coarsely cut forage.

Experiments show that bruised-forage silage is also more acidic than chopped-forage silage, and contains larger quantities of the desirable lactic acid. Butyric acid and ammoniacal nitrogen—both undesirable in silage—are lower in bruised silage.

The better quality silage produced by bruising may be due to rupture of a high percentage of plant cells. This causes the fermentation to be more rapid and of a different nature than that occurring in coarsely chopped forage. *Royster's Almanac*

Strip Processing -- New Corn Tillage Shortcut

Winter plowing can be followed by a one-step operation of land preparation and corn planting. The strip processor, mounted on the tractor, prepares a narrow band of soil 5 to 7 inches deep and 8 inches wide for the seed, while the area between the strips is left undisturbed . . .

Condensed from Plant Food Review

Gordon J. Ryder, Ohio State University

CORN growers will be hearing a lot about strip processing —one of the new wrinkles in land preparation and a recent entry on the growing list of minimum tillage methods.

This shortcut involves working plowed land in narrow strips for a desirable seedbed without overworking the rootbed between the corn rows.

This and other minimum tillage practices have been coming into their own in recent years largely because they enable farmers to prepare a good seedbed and at the same time reduce their operating and labor expenses. But what does the term, "minimum tillage," actually mean? Does it involve minimum seedbed tillage, or normal seedbed preparation in a minimum area?

Strip processing, in my opinion, is an example of normal tillage in a minimum area for the most optimum seedbed. In strip processing, a narrow band of soil 5 to 7 inches deep and 8 inches wide is prepared for normal seed germination and emergence. This is accomplished by mounting a 3-wheel rotary hoe attachment just ahead of the planter shoe. The area between the strips is left undisturbed.

During the last fifteen years, researchers in Ohio have tested a dozen or more methods of minimum tillage. In most of the experiments, minimum tillage methods have proved less satisfactory than conventional methods of fitting a seedbed for corn because of the difficulty in obtaining uniform stands from year to year.

With strip processing, however, equal stands have been obtained under a variety of soil conditions in Ohio during the past several years. Research findings have been substantiated by results of

Reprinted by permission from Plant Food Review, 1700 K Street, N.W., Washington 6, D. C.

on-the-farm demonstrations conducted cooperatively by farmers and Extension agronomists.

Here is the thinking behind the strip processing. It's generally recognized that corn needs a good seedbed for only 7 to 10 days. This seedbed, of course, should consist of fine soil particles and good seed-soil contact for rapid germination and emergence. For three to four months after emergence, the crop needs a rootbed that is not compacted, so that water intake and ample aeration is insured throughout the entire growing season.

In experiments covering the last 3 years, we have used conventional corn planters with rotary hoe attachments for strip processing. This has meant only one trip over the plowed ground to prepare the soil and plant the crop.

When the tractor operates at a speed of 3 to 4 miles per hour, the rotary hoes act to sift and sort the soil in the processed band. As the fingers of the hoe penetrate the soil, they tend to break up clods and eliminate air pockets in the plowed ground. As the teeth emerge, they flip the coarser soil particles to the surface, permitting the finer particles to sift down to where the seed will be planted.

Thus, the segregating action by the rotary hoes serves two purposes—fine crumbs sifted into the seed zone promote better seed-soil contact for rapid germination, and coarser particles lifted to the surface aid in the prevention of crusting.

Several arrangements of the rotary hoe attachments have been used to determine the most satisfactory alignment. Many changes have been made since the original equipment for strip processing was designed and tested a number of years ago, by John A. Slipher, former Extension soil conservationist at Ohio State University.

Best results have been obtained when rotary hoe wheels are mounted on two axles and overlapped so that the rear wheel acts as a cleaner for the two in front, which are placed 8 inches apart.

Production of acids is the most important change in the silage-making process, for acidity prevents the growth of undesirable bacteria which cause rotting or putrification. When enough acid is formed, fermentation is checked.

This arrangement has been tested extensively during the last three years.

A trial unit consisting of five rotary wheels was also tested last year so that soil particle size, time of emergence, early stand, and harvest stand and yield could be

compared with results obtained with the three-wheel model. Essentially, there was no difference in stand or yield between the two arrangements.

In the case of both arrangements, the rotary hoe wheels were mounted on the corn cultivator tool bar, replacing the two shovels that normally run on either side of the corn row. All other shovels were removed from the cultivator.

However, a number of farmers have mounted the strip processors on a 3-point hitch tool bar or have mounted frames between the tractor hitch and corn planter. The rotary hoe wheels have then been forced into the ground to a depth of 5 to 7 inches by hydraulic cylinders or by placing weight directly above the rotary hoe attachments.

On winter-plowed ground that has had time to settle, from 100 to 200 pounds is needed over each unit in order to force it into the ground. This depends, of course, upon the soil type and soil condition. The weight requirement on freshly plowed ground that has not settled or been compacted has been found to range from 75 to 150 pounds per unit.

No implement has proven superior to the moldboard plow in preparing a good seedbed. Plowing should be done when the soil moisture is at the proper level for maximum fracturing of the furrow slice. A properly operated plow that is correctly adjusted will leave the soil in a firm, crumbly state, free of air pockets. Any method of seedbed preparation depends upon a good job of plowing. Many times one or two extra trips over the field are necessary to cover up the effects of poor plowing.

As with any other form of minimum tillage, the farmer must exercise good judgment in using the strip processor. In properly plowed land, strip processors operate ideally. However, on winter-plowed or fall-plowed fields on which weeds have gained a foothold, one tillage operation is required to destroy them.

A spring tooth harrow can be used for this operation since it does not compact the soil as severely as disking. On soils of high-clay content that are difficult to plow, it may be advisable to use a clod buster or some leveling tool trailing the plow. This will fill in the voids and condition the soil to minimum tillage.

Once, parents knew best. Now, they know better.

Experience indicates that the weed problem generally has been less severe between the rows on strip-processed plots than on conventionally tilled land. The weed count in the processed band has averaged the same as in the conventionally prepared areas.

In effect, discing, harrowing, and other fitting operations serve to bring weed seed near the surface and prepare a seedbed for the weeds as well as for the crop being planted. Band application of pre-emergence herbicides has been used successfully by several farmers, with the result that only one cultivation has been required to adequately control weeds.

As might be expected with any form of minimum tillage, the strip process method reduces water run-off as compared with the conventional seedbed preparation. When the middle of the rows are left undisturbed, water penetrates into the plow layer very rapidly.

However, on seedbeds which have been prepared with a disc and other conventional tools, the surface of soils in many areas of Ohio tend to puddle, and water run-off is quite high.

For example, a run-off of 58 percent was recorded by John Slipher following a high intensity 2.2-inch rainfall on conventionally tilled Crosby silt loam with a 2 percent slope. Yet, run-off was negligible on the strip-processed area.

Following some high intensity rainfalls, effects of erosion are much more pronounced on conventionally tilled seedbeds, as compared with strip-processed areas.

As mentioned earlier, one of the main problems with most minimum tillage methods in Ohio has been maintaining an adequate stand of corn. Rainfall and soil conditions prior to emergence have been the primary cause for variations in stands on plots receiving the same treatment rather than different types of minimum tillage.

Small yield differences cannot be measured unless equal stands are obtained. In the accompanying table, corn stands are compared for strip-processed plots and conventionally fitted plots at 50 locations in 1959. The plant population was approximately 14,000 plants at harvest.

In 1959, as shown in the table, the average increase was 5.3 bu. per acre in favor of the strip processed plots on the 50 locations. In 1958 on 8 pairs of plots, the yield difference was 3.8 bu. increase in favor of strip process compared with conventional methods. Strip processing has produced equal or better stands than those resulting from conventional methods in these and several preceding years.

The best kind of pride is that which compels a man to do his best even though no one is looking.

Comparative trials of the last two years also showed the advantage of strip processing under widely varying rainfall conditions.

STRIP PROCESSING OUTYIELDS CONVENTIONAL METHODS

Comparison of corn stands and yields on 50 paired plots using strip processing and conventional seedbed fitting, 1959.

Soil Type	No. of Plots	Strip Process Stand (+ or −)	Yield		Yield Difference (+ or −)
			Strip Processed	Conventional Seedbed Fitting	
Brookston	16	+1400	110	99.0	+11
Crosby	10	− 300	84	79.4	+ 5
Celina	5	+ 900	105	91.0	+14
Miami	5	+ 400	89	101.0	+ 4
Hoytville	4	− 600	103	103.0	+ 2
Other	10	+ 200	99		− 4
1959 Average		+ 400	98.3	93.0	+ 5.3

Rainfall in 1958 was 12 inches above normal for the growing season, as compared with a deficit of 9 inches between May 1 and October 1 in 1959.

Farmers using the strip-process method of preparing seedbed for corn are reporting a saving of $3 to $6 per acre in their seedbed preparation. In addition to this saving in cost, the operation enables the farmer to use less equipment to prepare the seedbed and plant corn. On larger farms, the extra tractor operator and equipment can be performing other farm tasks during the corn planting season.

During the 1960 growing season, there were about 140 Extension demonstrations in 38 Ohio counties, and farmers have indicated an interest in minimum tillage and other methods being tested. However, a general trend in the direction of any specific minimum tillage practice has not been indicated.

It would be difficult to predict the future of any particular seedbed preparation technique for corn. With increasing labor costs, farmers are not interested in adopting a practice that means a peak labor season at corn planting time.

On many soils, it is necessary that plowing be done 2 to 3 weeks before corn planting time in order to coincide with the time of most optimum moisture content of the soil. It seems logical, therefore, that a method of seedbed preparation for corn should be a two-step operation—plow during the normal plowing season and follow up with seedbed preparation and planting in a second operation at planting time. This undoubtedly appeals to more farmers than a single operation of plowing, preparation and planting or some modification.

The strip processing technique

of preparing a seedbed for row crops has proved satisfactory on fall-plowed and spring-plowed soil. This does not create a peak labor season and it permits farmers to use 2-row or 4-row equipment at planting time. Operators of the larger farms are reluctant, of course, to accept a practice which necessitates using smaller equipment than they are now using.

Avoid Fertilizer "Burn" On Corn

Fertilizer does the most good for corn when it is placed two inches to the side and two inches below the seed, researchers report.

According to Dr. Orlo Musgrave, Ohio State University Extension Agronomist, such a placement puts the fertilizer a safe distance from the seed to avoid "burning"; it puts the plant food where corn roots can intercept it early, and it places the fertilizer where it will be in moist soil.

Fertilizer placement for corn is a more serious problem as farmers use higher analysis fertilizers and higher rates to the acre, Dr. Musgrave pointed out. In fertilizer "burn", he explained, corn plants actually die of thirst. Large amounts of fertilizer salts dissolve in the soil solution around the germinating seed and the plant cannot get water.

With good fertilizer placement, farmers avoid injury to the seeds and make the most efficient use of nutrients from the start of the corn plant to maturity.

When large applications of fertilizer are used, farmers may choose to plow down or broadcast part of it.

—West Virginia University

The type of road can make as much as a 20% difference in the market value of your farm, a recent study shows. And distance from town can make another 20%. If adjacent to a primary highway, for instance, add 10%. If adjacent to a secondary road or within a mile of a primary road, add 5%. If located on a dirt road that's more than a mile from the nearest hardtop, subtract 10%. While the effect of distance from town on value varies by section of the country, closeness can add up to 10%. A long drive from the nearest town can subtract up to 10% from the land's value. *—Farm Business Service*

He Mixes Corn Hybrids To Outwit Weather

Rains don't always come at the right time to insure good pollination so Jack Clayton plants mixtures of corn hybrids — gets yields up to 188 bushels per acre . . .

Condensed from The Furrow

CONSISTENTLY high corn yields have made John L. (Jack) Clayton, Polo, Ill., one of the Corn Belt's record producers. For the benefit of others, he offers a practice that has helped him produce yields of 167 to 188 bushels an acre since 1958. It adds up to outsmarting the weather by mixing hybrid seed before it goes in his planter cans.

Clayton minimizes spotty pollination and poorly filled ears that usually result from unfavorable weather by planting well-mixed seed of two, sometimes three, different hybrids. In various seed mixtures for 100 to 150 acres of corn a year, he uses a total of 8 to 10 different hybrids.

His Payoff is Higher Yields

Clayton explains: "Plants vary when grown from hybrids with different genetic backgrounds. This levels off yield-reducing effects of poor weather for pollination and maturity. Mixtures insure higher average annual yields than I'd get from planting only one of the hybrids.

"When you grow in the same row two or more hybrids instead of one, the plants' different pollination and maturity dates provide a wider spread of productiveness to outwit poor weather."

Illinois Experiment Station records show corn's critical weather period is from 50 days before full tassel to 14 days after. Variations in rainfall and maximum day-to-day temperatures during the period account for 70 per cent of yield variability. Yield reduction of close to 3 pounds per acre accompanies each degree of above-normal maximum temperature when corn is near full tassel. An inch of above-normal rainfall a week before full tassel, usually increases acre-yield about 4 bushels.

Clayton slaughters weeds

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wholesale. He spring-plows as early as possible, harrowing soon after to conserve moisture and coax weeds to grow. Then he disks and harrows down as many as three growths of sprouting weeds before planting. Weed-killing delays planting, so Clayton uses "large flats" seed to grow earlier maturing corn. One cultivation usually keeps weeds from seriously cutting his yield.

Spreads Feedlot Manure for Corn

Clayton picker-shells his corn when moisture ranges 25 to 30 per cent. It's stored in an airtight silo for feeding to hogs and cattle. He spreads feed-lot manure on brome-alfalfa land due for corn again in the 3- to 4-year rotation.

Insecticides Mixed With Corn Fertilizer Must Be Placed Right

With deep placement of corn starter fertilizer, insecticides mixed into the fertilizer to control soil insects may not be effective. Wisconsin entomologists John Falter and J. W. Apple report that deep-placed insecticide-fertilizer combinations were much less effective than insecticide granules applied in the row, closer to the seed in tests they made.

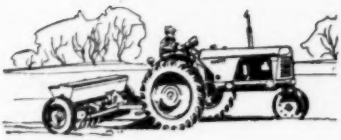
With deep placement, fertilizer is placed farther away from the seed than normally. The insecticide in the fertilizer is probably too far away to do a good job of controlling soil insects. Researchers believe machinery manufacturers should provide separate insecticide applicators on deep-placement machines. This is a feature of some new models.

Falter and Apple found a 6½ per cent increase in corn yield from placement of aldrin and heptachlor granules in the row. But when the insecticide was carried in the deep-placed fertilizer, yield increase was only about 1½ per cent.

These increases were due to control of wireworms. Deep placement of fertilizer-insecticide also seemed to give slightly less effective control of rootworms, which cause lodging after the corn grows tall.

Falter and Apple also found there's little need to worry about injuring your corn stand when you apply granular insecticides in the row with the seed. An overdose doesn't seem harmful. They tested heptachlor, aldrin, and dieldrin insecticides and the solvents which might be used to prepare these insecticides in granular form. A doubling of the normal rate of application failed to cause any significant yield reductions. —*University of Wisconsin*

New Idea: Plant Corn Solid



New idea in corn growing: Plant in 7-inch rows — 20 times as thick as ordinary corn — then harvest for silage or green manure. You plant, then harvest — never cultivate . . .

Condensed from Farm Journal

CAN you plant corn in a solid stand with your grain drill —about 300,000 stalks per acre— then harvest it 50 to 60 days later for green feed or silage?

Farmers are being sold on the idea—fast!

Last summer, we found them trying it in all parts of the country. Farm Journal decided then that the idea deserved a closer look, so we began asking farmers how it was working and how they liked it.

● "Beats anything we've ever tried," say Bob and Don Buckland, Wayne County, Ind. They used a grain drill to plant 275,000 kernels per acre on April 24 and estimate that their 11-acre field averaged "at least 40 tons of 70% moisture silage per acre" July 14.

● "I'm tickled to death with my solid-planted corn," says M. A. Roney, Dyer County, Tenn. "After reading about it, I thick-planted 12 acres right alongside 20 acres in 40-inch rows. I fertilized and irrigated both fields the same—even planted 'em the same day.

"Well, the solid-stand corn made *nearly twice the tonnage in half the time.* Six weeks after planting, those 12 acres made 30 tons more silage than the whole 20-acre field of 40-inch corn did 12 weeks after planting," says Roney.

● "I really like this thick-planted corn," says Clayton Peckham, Windham County, Conn. "I planted June 8 and started to green-chop Aug. 2—seven weeks later. Those two acres fed 60 head of cattle, including 38 milkers, for 19 days. *I had the same patch in millet one year and it fed 38 head for only four days!*"

● In Barnes County, N.D., LaVerne Homan's solid-stand corn, stunted by drouth, racked up 13 tons per acre, compared with only four tons for his regular-planted corn.

Westerners are trying solid-stand corn, too.

● "I'll put in 35 to 40 acres this year," says Brad Plott, Teha-

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ma County, Calif. He experimented with 20 acres last year—planted 150 lbs. of seed per acre with a Grassland Drill in June after taking off a crop of oat hay. The corn averaged about 35 tons per acre.

● "It was up in a week and never quit growing," says Allen Klindt, Yellowstone County, Mont., who drilled in 150 lbs. of a silage hybrid per acre on July 15. On Sept. 20, he harvested 24½ tons of silage per acre.

● "Gives us six to eight weeks of good, green-chopped feed right when we need it most," says Don Youngquist, Skagit County, Wash. He socked in solid-stand corn on July 9 and harvested 16½-ton silage two months later.

● In Logan County, Colo., three acres of solid-planted corn

Numerous tests show that planting oats late has decreased yields as much as a bushel or more per acre for each day of delay.

racked up 33 tons per acre for Bill Fletcher.

Colleges are testing the idea. Reports Al Neumann, head of beef cattle research at the University of Illinois: "We planted eight acres with a grain drill in late April and harvested 18 tons of silage per acre on July 15. Then we plowed, drilled the field back into corn and harvested a second, 22-ton crop on Oct. 15."

In other University of Illinois tests, two crops of solid-stand corn added up to 60 tons per acre at DeKalb and 55 tons at Brownston.

Is The Feed Any Good?

R. G. Sallie, Orangeburg County, S.C., who irirgated six acres of solid-stand corn that averaged 30 tons per acre, evaluates it this way: "After feeding about 100 tons to milkers, I figure that it takes four pounds of solid-stand silage to equal three pounds of regular corn silage.

"To put it another way, this feed is *about the equal of sorghum silage, half again better than oat silage and far better than millet silage* which my cows just won't eat."

Says Don Youngquist: "Milk production held up well when we switched from green-chopped clover to the solid-stand corn. But production dropped when we ran out of the green-chopped corn and had to start feeding grass silage and alfalfa."

Dairyman Raymond Atkinson in Callaway County, Mo., reports that "our cows made just as much milk on solid-stand corn as they did on other green-chopped crops." The other crops were Sudan grass, red clover, wheat and rye.

Adds Atkinson: "Maybe green-

chopped oats makes better feed, but *neither oats nor any of the other crops makes 30 to 40 tons per acre.*"

LaVerne Homan, the North Dakota farmer, has already had one winter's experience with solid-stand silage. "When we switched over from regular corn silage last winter, milk production went up," he says. "The cows ate it better—held their flesh, too."

George E. Clark Jr., who grew 50 acres in St. Marys County, Md., says that "six weeks after planting, you have a top-quality feed for green chopping."

And in Union County, Ohio, Russell Case, who grew 350 acres of solid-stand corn, says flatly that "it's considerably better feed than grass silage."

Although solid-stand silage apparently makes good feed, you can't expect it to be the equal of regular corn silage in most rations. Limited laboratory tests show that it runs 10% to 15% total digestible nutrients, compared with 18% to 20% for regular corn silage. Protein content also tends to run lower—8% to 10% compared with 14% to 15% for regular corn silage.

But generalizations are risky because the nutrients in solid-stand corn—like hay—vary according to the time it's harvested and the fertility of the soil. Furthermore, in solid-stand plantings, *certain hybrids contain "half again as many total digestible nutrients as other hybrids,"* reports Keith Keltgen, agronomist, Trojan Seed Co., Olivia, Minn.

At the University of Illinois, scientist K. E. Harshbarger is feeding solid-stand silage to *growing dairy heifers.* "At the end of eight weeks, the solid-stand silage does not measure up to regular corn silage," he reports.

Corn for Green Manure?

Plowing under solid-stand corn may be the way to add organic matter and loosen up tight, hard-to-work soils.

In 1959, Howard Lathrope, agronomist for Allied Chemical Corporation's Nitrogen Division, plowed under two crops of solid-stand corn on the Carl Mabry farm in Hancock County, Ill. These two crops added up to a whopping 100 tons—at least four times what a single crop of ordinary corn produces.

At the latest count, the civilian payroll of the Federal Government listed a total of 2,361,000 persons. If all these people with their familes were brought together into a single city it would be the second biggest city in the United States.

It takes fertility to make that kind of growth. Lathrope plowed down 200 lbs. of nitrogen in the

form of Uran, 182 lbs. in fertilizer. He also spread 200 lbs. of nitrogen on the flattened-down first crop as he plowed it under.

The pay-off came in 1960 when Lathrope planted the land to corn for grain. It yielded 123 bushels —53.4 bushels more than corn alongside which followed regular corn.

"Don't under-rate corn as a green manure crop," says Lathrope. "It may very well be the best one we've got."

How to Try Solid-Planted Corn

If you would like to try planting corn solid this spring, here are suggestions based on the experiences of farmers who grew it in 1960.

1. From 250,000 to 300,000 stalks per acre—about three bushels of seed—seems to be the most practical rate of planting.

As crop yields go up, production costs per bushel go down and profits rise.

2. Drill the corn in six- or seven-inch rows with your grain drill.

3. Use hybrid-seed—rounds, tips or flats—*which most companies sell at a reduced rate*—of a medium-maturity, silage-type hybrid.

Is hybrid seed worth the extra $7 to $10 per acre? What few tests we have indicate that gambling with "crib-run" seed is penny-wise and pound-foolish. A hybrid comes up faster, makes more and probably better feed, lodges less and matures on schedule.

4. Shoot for two crops unless you live in a short-season area.

Plant the first crop as early as you can—late April in the southern Corn Belt—and plan to harvest in late June or early July. Then sock in a second crop.

In USDA tests at Beltsville, Md., 3½ bushels of corn per acre, planted in early June with a grain drill, made about 28 tons of silage per acre in late July. Unavoidable circumstances delayed the second planting until the third week in August, but it yielded about 13 tons per acre six weeks later.

Even though the solid-stand corn tested between 85% and 90% moisture and ran lower in protein than regular corn silage, the USDA scientists were impressed with the more than 4,000 lbs. of total digestible nutrients in that first 28-ton crop, but aren't yet ready to recommend solid-stand corn.

In short-season areas, such as North Dakota, where only one crop appears to be practical, mid-June is a good time to plant a 90-day hybrid.

5. Sock on the fertilizer or manure. In the central Corn Belt, put on about what your soil

would need to grow *two* 125-bushel crops of corn.

Without extra plant food—especially nitrogen—the crop won't make the growth and feed that you're after.

6. Harvesting can be a problem unless you have a high-capacity forage harvester. *Take the crop 55 to 60 days after planting*—before it gets much more than head-high. Leave it longer than that and you're asking for lodging and harvesting trouble.

In the higher-rainfall areas, direct-cut forage ran almost 90% moisture, which is too wet for good silage.

Here's an idea: To bring the moisture down to 70% to 75% —about what ordinary corn silage ought to be—the Buckland Brothers, mentioned earlier, wilted the stalks after running them through their mower-crusher.

The Bucklands put shields on the rear of their mower-crusher

Get a germination test on your homegrown seed.

to funnel the stalks into a swath 6" to 8" narrower than the mower-crusher. This left a 12" to 16" space between swaths so their side-delivery rake could get hold of the stalks. They mowed-and-crushed in the morning, then raked and chopped the afternoon of the following day.

Another idea: "We think it might be possible to direct-cut solid-stand corn, then add ground dry ear corn or barley at the silo to bring the moisture down to 70%," says George E. McKibben at the Dixon Springs (Ill.) Experiment Station. "This ought to give you a good all-in-one ration for calves."

Not All Peaches-and-Cream!

In Butte County, Calif., Perry Garst's thick-planted corn grew 12 feet tall—"we couldn't get through it with our harvesting equipment."

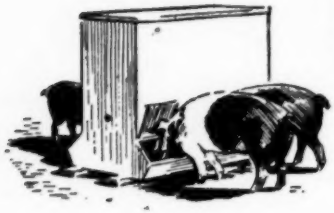
A. C. Smith, Scotts Bluff County, Neb., doesn't believe that solid-stand corn has enough of an advantage over corn in 40-inch rows. "We had trouble irrigating it and got an uneven stand."

George E. Clark Jr., mentioned earlier, who staggered plantings of solid-stand corn, nearly lost his June 25 and July 8 plantings to the fall army worm. "The corn also lodges very badly about seven weeks after planting."

Still other farmers and scientists question whether the solid-stand idea actually makes more feed. And whether it's practical without irrigation.

But all agree that it's a way to grow corn without a corn planter, cultivator or row attachment for your forage harvester. And some scientists predict that the solid-stand idea—if and when we learn how to use it—will lift the ceiling on silage yields.

What About High-Moisture Corn For Hogs?



High-moisture corn is a satisfactory feedstuff for growing finishing hogs . . .

Condensed from
American Livestock Journal
William A. Hunt and *Damon V. Catron,* Iowa State College

INTEREST in storing high-moisture corn and feeding it to livestock has been growing.

Rigid requirements for storage and the cost of drying corn have given push to the search for ways to preserve corn with excess moisture without great loss of nutrients and spoilage.

Successful storage of corn harvested at an early date allows livestock producers to use cornstalks, either as silage or pasture, at a time when they have a greater nutritive value than later. Harvesting losses also are minimized when corn is removed from the field before stalks become brittle and blown over. An additional advantage of high-moisture corn could be a superior nutritive value.

Feed to Swine?

● A series of tests over an 18-month period has shown that high-moisture corn is a satisfactory feed-stuff for growing-finishing swine. It's highly palatable. To maintain quality, however, it requires special storage and handling, especially in warm seasons.

Pigs fed high-moisture corn in tests made equal, and sometimes superior, gains to pigs fed dry corn. But more feed per pound of gain was required on a high-moisture corn diet when the pigs were offered corn and protein supplement free-choice. Pigs offered high-moisture corn and protein supplement free-choice tended to eat a higher proportion of corn than comparable pigs offered dry corn and supplement free-choice. When we limited protein intake in a complete ration, however, less feed was required per pound of gain by pigs fed high-moisture corn than those fed dry corn.

High-moisture corn has received a variety of definitions. But all agree in one respect—that the corn contains enough moisture to promote some degree of fermenta-

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tion during storage. The preferred method is to harvest the corn when it still contains a high level of moisture, usually more than 20 per cent. Another method is to add water during or after placement in the storage structure. Our tests were with corn harvested and stored when it contained the desired amount of moisture.

Preserving high-moisture corn as a feedstuff with maximum nutritional value involves several factors. Air-tight storage is needed if the corn is to be preserved for feeding in the spring and summer months.

Storage Facilities:

● There were several combinations used, but the air-tight silo proved to be the most satisfactory and was used extensively in this experiment. Since these proved to be satisfactory for storing high-moisture shelled corn, it was possible to maintain a sufficient concentration of carbon dioxide to prevent undesirable microbial growth.

Feeding Tests:

● A series of tests were conducted in 1958-1959 to compare high-moisture (25.3 per cent) corn with dry corn self-fed to pigs that had access to a 33 per cent protein supplement. Two tests were run during the winter months and a third during the summer.

High-moisture corn was added to self feeders at 5-7 day intervals in the winter and daily during the summer. There were no feeding problems of either freezing or spoiling under these conditions. Both the high- and low-moisture corn and the protein supplement were offered free-choice from self feeders.

In one of the winter tests and the summer test, average daily gains were nearly the same for both low- and high-moisture corn. In the other winter experiment, pigs offered the high-moisture corn gained 10 per cent faster than the pigs offered dry corn.

Of the pigs involved in two of these three tests, 110 were live probed to see if there might be an influence on depth of backfat from using high-moisture corn. Also, 25 pigs were slaughtered at market weights to find any effect of high-moisture corn on carcass quality. We noted no differences in backfat by live probe, in depth of carcass backfat or in dressing percentage.

Don't wait until a field turns green with quackgrass before going over it again with a field cultivator. Cultivate the field often enough so the roots can't get re-established.

Feeding Test 1959-1960: The next winter, corn at four different moisture levels—12, 19.8, 24.7 and 31.9 per cent—was ground and mixed with soybean meal and

fortified with minerals and vitamins to form a complete feed for growing-finishing pigs. Grinding and mixing were necessary at weekly intervals to avoid spoilage, even though the feed was stored at relatively low temperature. No antibiotics, sources of unidentified growth factors or feed additives were included in the ration. This was so that any unidentified beneficial factors in the ensiled corn would have an opportunity to exert their influence.

Average daily gains for all four moisture-level treatments were nearly identical. Growth wasn't as rapid as might have been expected, but this may have been due to exclusion of antibiotics and sources of unidentified growth factors in the rations.

One of the best labor-saving devices on the modern dairy farm is the high producing cow. One cow producing 500 lb. of fat a year makes almost as much profit above feed costs as two cows producing 300 lb. apiece.

There were differences in the feed-conversion rates for the corn at different moisture levels. On an actual feed or equivalent dry-matter basis, pigs receiving the dry corn in their ration required 4.7 per cent more feed than pigs receiving the ration including corn at 31.9 per cent moisture. Pigs fed the rations containing corn at 19.8 and 24.7 per cent moisture required 11.4 and 8.2 per cent more actual feed, respectively, than those fed the ration containing corn at 31.9 per cent moisture.

Our final experiment was conducted to see if pigs fed a low-protein, high-moisture corn ration grew as rapidly and were as efficient in feed conversion as pigs fed a low-protein ration containing dry corn. Corn from the same storage units used in the previous experiment was used.

Soybean meal pellets fortified with vitamins and minerals were added to the shelled corn containing 12, 19.8, 24.7 and 31.9 per cent moisture. Pigs averaging 33 pounds were started on a ration containing 14 per cent protein and were shifted to a 12 per cent protein ration at 50 pounds of body weight. At 125 pounds, the ration was changed to include 10 per cent protein until the pigs reached 200 pounds. No anti-biotics, feed additives or sources of unidentified growth factors were added.

Pigs fed the rations containing corn at 19.8 and 24.7 per cent moisture made identical average daily gains. Pigs fed the ration containing corn at 31.9 per cent moisture gained at a 7.7 per cent slower rate, while those fed the dry-corn ration gained the slow-

est—16.1 per cent less rapidly than those making the fastest gains.

The amount of feed required per pound of gain for all pigs receiving the rations containing high-moisture corn was nearly the same. Pigs fed dry corn required 3.5 per cent more feed per pound of gain.

How Much Can You Pay For Feeder Pigs?

How much can a farmer afford to pay for feeder pigs?

Roie M. Godsey, swine specialist at Virginia Polytechnic Institute, says this depends on the value of the finished hogs, cost of raising them, and death loss. Here is a hypothetical case:

To determine the finished value, Mr. Jones first estimates the price at the time he will sell the hogs, and their probable weight. If he wants to buy 35-pound feeder pigs in late May to sell in October, he may estimate the October weight at 225 pounds, the price at $16 per cwt. The weight is based on experience in the rate of gain; the price is a forecast. His expected income or net value at the farm is 225 pounds times $16 per cwt., or $36.

He then should estimate probable costs. Figures vary from year to year and from farm to farm. But experimental results show the average farmer uses 350 pounds of corn and 50 pounds of protein supplement to add 100 pounds weight. This would be a total of 665 pounds (about 12 bushels) of corn, and 100 pounds of supplement to increase the weight of the pigs from 35 to 225 pounds.

With corn at $1.14, the cost for 12 bushels would be $13.80. With supplement at $5 a cwt., total cost would be $18.80. Feed is the largest cost item, but labor, shelter, equipment, interest, and veterinary costs count too. Usually these amount to 1/5th of the feed cost. This would be $3.76, bringing total production costs to $22.56.

Difference between income and total cost is the first estimate of the price a farmer can afford to pay for a feeder pig. This is $13.44. This figure should be adjusted for death loss. Probable survival rate is multiplied by the margin over cost per pig. The fictional Mr. Jones expects a death rate of 5%, or a survival rate of 95%. This is based on his own records. Multiplying margin per pig ($13.44) by 0.95 gives price per pig—$12.77 in this instance.

If Mr. Jones pays this price for a feeder pig, he can expect to get market price for his feed, average wages for his labor, and to cover all his costs for shelter, equipment, and other items. If he can buy a pig for less than $12.77, the difference is profit.

—Virginia Polytechnic Institute

Which Hybrid Is Best For You?

Choosing the best corn variety for your farm could mean an extra 15 to 20 bu. per acre. Ask for production figures before you buy . .

Condensed from Massey-Ferguson Farm Profit

THE day you sign up for your 1961 hybrid seed corn can be the day you make the best wages of the year. Or it may be the most costly day of the year if you make the wrong decision.

Corn yield studies conducted each year by many of the agricultural colleges show that there is often a yield difference of 20 to 30 bu. or more per acre between the top and the lower yielding hybrids. Agronomists at Iowa State last year kept records of 233 hybrids grown on 24 fields. Range in yield varied from 66 to 137 bu. per acre. Variations however, are usually smaller under usual farm conditions.

Figuring corn at the price support average of $1.06 per bu., selecting a variety capable of yielding an extra 15 bu. would pay you $15.90. For 75 acres of corn, that adds up to nearly $1,200. A hybrid with the ability to yield 10 more bushels would boost income $10.60 per acre, or $795 on 75 acres. When the seed corn salesmen visit your farm this fall, ask them some searching questions about results in official production tests. Better yet, ask your county agent or high school vocational agriculture instructor for a copy of state trial results.

Agronomists point out that when comparing varieties it is best to consider results of more than one field trial. The more test trials made, the more accurate a yield average will be.

Buy disease resistance: When selecting a hybrid, you should also take into consideration your particular type of corn growing program. For example, Marcus Zuber, University of Missouri, says that continuous corn growing builds up disease and insect hazards. He recommends that farmers following this procedure pick hybrids that have superior disease resistance.

Stagger maturity: In Wisconsin, agronomist N. P. Neal points out that many farmers cut yields by planting corn with the wrong

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Massey-Ferguson Farm Profit, 710 North Plankington, Milwaukee 3, Wisconsin

maturity date for their area. "Many varieties planted in the state are not early enough for grain production," he says.

To be sure that part of their crop will be ready to crib by early October, some Iowa farmers buy early maturing hybrids and plant them first. They follow these with mid-season hybrids and plant late maturing hybrids last, but not after May 25. After this date, go to early hybrids again.

Dwarf hybrids: You may want to give one of the dwarf hybrids a try this year. However, if you do, you had better get your order in soon. Seed is available only in limited quantities.

In general, there are two types of dwarf corns—one with a multitude of small ears on each stalk designed for combining, and semi-dwarf corn that is like regular corn only it has shorter spacing between the joints or nodes.

Main advantage of the dwarf hybrids is that they resist lodging. Dwarfs tested in Illinois over a 3-year period had less than 2% stalk breakage. Illinois agronomist R. W. Jugenheimer points out that this advantage is especially important in areas where high winds and storms are common.

"However, to be satisfactory, dwarf hybrids should be of intermediate height, with ears at least 24 inches above the ground," says Jugenheimer. "If corn is too short, harvesting becomes difficult. The husking rolls of most conventional equipment are often unable to gather all dwarf ears."

B. G. Johnson, University of Wisconsin agronomist, says that the dwarf varieties lend themselves to closer planting and could possibly produce more bushels. The shorter plants also allow more light to reach the lower leaves—light is one of the limitations in high grain production.

However, to date, relatively few dwarf hybrids have produced yields which compare favorably with the standard hybrids. On the average, dwarfs have yielded 10% to 20% less.

High protein corn: Another new type of hybrid is that that has an extra high oil and protein content. Jugenheimer says that two newly-developed hybrids, Illinois 6021 and Illinois 6052 yield about 30% more oil and 10% more protein than present commercial hybrids. "These two hybrids are similar in grain yield to

Alabama experiments showed peanut harvesting cost cut almost in half—from $33.48 an acre to $18.62 an acre—with use of pull-type pickers or combines, instead of stationary pickers. Average yields are almost equal: 1,318 pounds for pickers or combines, 1,276 for stationary pickers.

standard varieties, but are not quite as attractive.

"Both millers and livestock feeders stand to benefit from high-oil corn," says the Illinois agronomist. "Corn oil is a valuable by-product of the milling industry, it is nutritious and also has many industrial uses. In feeding trials at the University of Illinois, market lambs fed high-oil corn averaged more gain on 6% to 7% less feed.

Before buying your seed, it'll pay you to contact your county agent or vocational agriculture instructor, or state agricultural college. They can help you select a hybrid that is adapted to your area and tell you where to purchase seed of some of the relatively new hybrids on the market this year.

Dust After Shearing Controls Sheep Ticks

The best time to kill sheep ticks—the blood-sucking plague—is just after shearing, according to R. E. Pfadt, Wyoming University entomologist.

Woolgrowers can effectively control ticks by dipping, spraying, or dusting. Of the three methods, dusting is best because it is fast, economical, and effective.

One dusting just after shearing with 1½ percent dieldrin diluted with pyrophyllite will completely eradicate an infestation of ticks, Pfadt says. Pyrophyllite works best for filler because it doesn't produce dense dust clouds which fill the chute and stop the sheep from passing through.

A power duster at the end of a narrow chute is the easiest way to apply the insecticide. As newly-shorn sheep run through the chute to pasture, they receive a light coating of dust. Using this method, woolgrowers can treat 2000 to 3000 sheep in an hour.

For complete control, easy treatment, and safety, Pfadt advises sheepmen to:

1. Run sheep with the wind, and keep them moving through the chute.

2. Treat all sheep—ewes, lambs and bucks—keep any untreated sheep out of the flock.

3. Set chutes in the open, away from buildings, so the wind will blow excess dust away from the operators and the sheep in the chute.

—Wyoming Agricultural Information

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Pre-season Practices To Prepare For Corn

Getting ready is the first step in good corn production. This article covers practices and equipment for pre-season work and the effect each practice has on subsequent operations . .

Condensed from Implement & Tractor

Frank Buckingham

AN ANALYSIS of a corn production system should start well in advance of the actual planting season.

Therefore, this article will consider pre-season work such as land forming, drainage, disposal of residue from the previous crop, spreading fertilizer, fall plowing and other jobs that may be completed prior to spring planting time.

Many corn belt farmers could benefit a great deal by using the practice called land forming, land shaping, land planing and other similar terms. Land forming does not mean to make a field completely level, except for some specific irrigation programs. All that is required is to get a uniform slope in at least one direction. fill low places that would otherwise drown out in wet weather and level off high spots that would burn up in dry weather.

Land forming is necessary when land is to be irrigated whether a surface or sprinkler system is used. It will permit more efficient use of machinery and will save irrigation water by letting it flow evenly over the entire field.

In areas where irrigation is not a common practice, land forming may mean filling gullies and smoothing slopes to permit better machinery operation and reduce erosion. Or it may mean smoothing a nearly level field to promote better drainage and eliminate potholes and middle-of-the-field turns to avoid getting stuck.

By forming the land runoff water is spread over the surface where more will soak in and provide a greater moisture reserve for dry weather. With runoff water spread out more the danger of erosion is reduced and field size may frequently be increased. Larger fields will then mean savings in time and increased efficiency with large machinery.

A large scale land forming job will require the help of a special-

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ist and the land should be surveyed and staked and an estimate made of the amount of earth that must be moved. If a large volume of dirt is to be moved it may be best to hire a contractor and let him do the job. For smaller jobs a scraper and land leveler pulled by a farm tractor will do the job satisfactorily. For moving dirt less than 300 ft a bulldozer is ideal for the rough grading; for greater distances a wheeled scraper will usually be more economical.

Quite often a land leveler pulled by a farm tractor will be all the equipment needed to do a satisfactory job if only minor grade changes are necessary. Once land has been formed properly it is only necessary to conduct periodic maintenance with a land leveler or scraper and no additional major operations are required

A frequent objection to land forming concerns the exposure of a layer of relatively unproductive subsoil when large amounts of topsoil must be moved. To offset this the exposed areas may be covered with liberal amounts of manure and fertilizer heavier than the rest of the field and in a few seasons they will generally be as productive as the undisturbed or filled soil. Another means of counteracting the problem of topsoil removal is to take the topsoil from the high areas in alternate strips and take out more than enough to bring the land to grade. The remaining ridges are then leveled off spreading a layer of topsoil over the entire area. In some instances the topsoil may be scraped off first and stockpiled; after the leveling is completed the topsoil is then spread evenly over the entire area. This will give a uniform layer of topsoil but is usually more expensive than other methods.

It is generally recommended that low spots which are to be filled in a land forming operation be gone over with a subsoiler before the filling starts. This will help to break up any hardpan layer that may have developed from water standing on the surface. It may also be advisable to use the subsoiler again after the land is formed to break up any compacted areas caused by heavy equipment or concentrated wheel tracks.

Starter fertilizer, high in phosphate, will push young corn seedlings fast to get ahead of weeds and up to good height for early cultivations.

Drainage, of both surface and subsurface water, is a big problem in many areas. In some places the answer is tiling, in other areas open ditch drains work better, and a recent development that looks promising is the use of ver-

tical mulching. There are machines on the market for placing perforated plastic tubing in the soil to serve the same purpose as a tile drain. The use of a subsoiler may be enough to break up an impervious layer in the soil and permit better drainage. However, this is usually only a temporary measure and must be repeated every few years

Tile drains should always be surveyed and laid out by a specialist to assure a satisfactory job. Installation of the tile may then be done by machine or entirely by hand.

Open ditch drains should also be planned well to avoid unnecessary point rows and small patches. In some fields a random ditch pattern connecting low spots may be enough to drain the problem areas and still permit farming across the waterways. Another solution is to put in a regular rectangular pattern of ditches with no attempt to farm across them.

Vertical mulching with a combination forage harvester and subsoiler has given very good results in controlling erosion and improving drainage in Indiana tests. The slot made by the subsoiler is blown full of crop residue by the forage harvester. The residue holds the ground open and permits faster penetration of surface water into the soil. It also helps control erosion by slowing runoff water and holding it till it can soak into the ground. Vertical mulching is credited with improving soil tilth and increasing the activity of earthworms and other soil improving organisms.

The slots made by the vertical mulcher are about 30 inches deep and should be filled with dry crop residue such as straw or dry corn stalks. Green plants such as meadow crops seem to decay too quickly and do not hold the soil open as long as dry material.

Any surface or subsurface drainage program should be accompanied by land forming to improve the effectiveness of the drainage. Land forming will eliminate low spots that are slow to drain anyhow and will increase runoff to open ditches. It may also reduce the number of ditches required, and in some cases land forming by itself may be enough to correct a drainage problem.

Agricultural engineers advise farmers to read carefully instructions before planting with new corn planters. Check the rate of planting with the tractor operated at the speed you expect to drive, they suggest.

Building terraces and planting on the contour have been shown in many experiment station tests to cut operating costs, decrease soil erosion and increase crop yields. By using parallel terraces, which cut down the number of

point rows and sharp curvatures, a farmer may use larger equipment and reduce his operating time.

Parallel terraces require movement of a great deal more earth in their construction than conventional terraces but are much easier to farm and maintain.

Pre-season work may also include application of dry, liquid or gaseous fertilizers. This may be done by the farmer with a tractor-drawn fertilizer spreader or hired done by a commercial operator. Labor availability and cost will determine whether to hire fertilizer spread or not.

When fertilizer is applied in the fall it should generally be plowed or disked into the soil to prevent excessive losses from runoff of spring rains and melting snows. Before any fertilizer is applied the soil should be tested to determine the proper amount and kind of fertilizer that will produce the greatest return. The same is true when applying lime to acid soils.

Farmers have long debated the relative merits of spring and fall plowing and the effect each has on yield, erosion, soil condition and operating costs. In tests at several agricultural experiment stations fall plowing has consistently outyielded spring plowing and usually dries out sooner in the spring permitting earlier planting. Fall plowing also reduces the amount of spring work to be done and will enable more work to be done in a year with the same equipment and labor supply.

Some Iowa tests have actually shown that less soil was eroded from fall plowed land than from a similar field with only standing cornstalks for protection. Use a disk plow, which generally does not cover crop residues as well as a moldboard plow, may leave enough trash exposed to cut down winter soil losses from wind and water erosion on fall plowed land.

Crop residues may be disposed of by disking, cutting with a ground or top driven stalk cutter, or used as a vertical mulch. If a disk plow is used crop residue will probably not be a problem, nor will it bother in a mulch tillage program.

Mushrooms are an agricultural paradox; they grow in darkness, not light, are planted in the fall and harvested in winter and spring; and need low temperatures instead of summer heat. Scientists say they require more agricultural skill and care than almost any other crop.

Some tests have been conducted at Iowa State University to determine the feasibility of simply killing the previous meadow crop

with a herbicide and planting corn with no plowing and a limited amount of soil preparation. This will require further study before it is recommended but it is another possible method of land preparation.

All of the pre-season work outlined here has had the same purpose behind it, to improve the productivity of the land, the operating conditions for the machinery to be used in putting in a corn crop and to determine possible ways to cut corn production costs.

Pattern For Corn Planting

Equipment available for planting, cultivating and harvesting now determines the width of corn rows. How much would be gained by making rows more narrow, or by double planting so that rows are only 20 inches wide?

Many kinds of planting patterns have been tried by S. R. Miles, Purdue University agronomist. He planted in rows of various widths, some of which could not be cultivated with conventional tools, even trying a checkerboard plan in which plants were 16 inches apart each way.

Miles concluded from his carefully conducted experiments that as long as he kept the population or number of corn plants per acre the same, he got little variation in yield. The number of corn plants per acre was the important consideration. Farmers can get their desired population by planting at one rate in the usual 40-inch rows, or by wider spacing between plants in narrower rows.

Moisture supply, soil type, plant food, hybrid used and other factors determine the population to plant. Under dry soil conditions a pattern that does not crowd the plants in the row results in less drought damage.

Efforts of farmers in the Indiana Five-Acre corn work to step up yields by planting in 20-inch rows have seldom given satisfactory results. Generally 36-inch rows are as narrow as farmers try, and 40-inch rows are by far the most common. Planting one grain every nine inches in the 40-inch rows should give a population of 15,000 plants at harvest, and one every ten inches gives about 13,000. Hybrids vary somewhat in sensitiveness to thick planting. —*Purdue University*

Report on Dwarf Corn

Corn breeding has not stopped with the discovery of hybrid corn but has unlocked the gate to unlimited possibilities. Dwarf corn currently holds the spotlight . . .

Condensed from Successful Farming
T. L. Wainscott

THERE'S a lot of interest these days in dwarf corn. Small plots have appeared throughout the Corn Belt. College research and commercial corn breeders report yields somewhat below normal hybrids. Foundation seed is reported to be available in the near future. Just where do we stand?

First, the impression seems to be there is only one dwarf corn. Actually, there's a whole family! There are a number of different recessive and similarly inherited factors which affect height of a corn plant. A list of known dwarfs includes: *d w a r f*-1, *dwarf*-2, *dwarf*-3, *nana*-1, *nana*-2, *brachytic*-1, *brachytic*-2, *brevis*, *pygmy*, *anther-ear*, *compact*, and *reduced*.

A number of these known dwarf genes result in plants which are much alike in appearance. Some of these are known to be different, however, because when crossed together they give normal progenies. If two individually isolated dwarfs are crossed together and they give a dwarf progeny, it is assumed they carry the same dwarf gene. The degree of dwarfism varies. For example, *dwarf*-1, and *nana*-1, give extreme dwarfism. The mature plants are only 1 or 2 feet tall.

The group of dwarfs which may have the greatest economic significance are those which the plant breeders describe as semi-dwarf. *Brachytic*-2 and *compact* are two of the most promising semi-dwarfs.

There are distinct differences between these two types. The *brachytic*-2 is a type in which dwarfing is brought about by a shortening of plant internodes without markedly affecting the other plant dimensions. Therefore, the leaves are still long and broad and the stem is thick. These normal characteristics, coupled with the shortened stem, give the plant a particularly luxuriant appearance.

The *compact* type is an example of a dwarf in which all the plant parts seem to be reduced to approximately a proportional ex-

Reprinted by permission from Successful Farming, Des Moines 3, Iowa

tent. Leaf width, leaf length, stem diameter, and internodes are all reduced to an approximately equal degree. This proportionate reduction gives the plant a trim, compact appearance, from which the type derives its name.

The dwarfing genes are all recessive genes. This means it is necessary that all inbreds which appear in the hybrid must be converted first to this dwarf gene. This means that all 4 inbreds must carry the dwarf gene before a dwarf double-cross hybrid can be produced.

Advantages of Dwarf Corn

The original goal of corn breeders in the field of dwarf corn was standability. Dwarfs offered one answer to the serious lodging problem. As corn growers went to higher plant populations and heavier rates of fertilizer, yields increased, but so did lodging. Taller, heavier stalks, and heavier ears caused the stalks to break. This has become particularly serious in the latter part of the harvest season.

The *brachytic*-2 dwarf corns average only 4 feet high with normal-size ears 12 to 20 inches from the ground. Planted along-side normal hybrids, *brachytic*-2 dwarfs have remained 99% erect, while a normal hybrid is only 38% erect as late as the last week in November.

The *compact* type has averaged 3½ feet in height in 40-inch rows, with ears 18 inches above the ground. Early reports indicate this type also will withstand lodging much better than normal hybrids.

In tests conducted at several Illinois locations, stalk breakage in dwarf hybrids averaged less than 2% and has never exceeded 10% in any dwarf studies. These tests have included conditions under which stalk breakage in normal hybrids has exceeded 80%.

Harvesting losses are lower in dwarf corn than in normal hybrids. Agricultural engineers at the University of Illinois are running large numbers of comparative tests on this point. Results so far are very encouraging. The over-all dwarf corn losses totaled only 5½% at timely harvest, and only 9½% when harvested late.

Combines equipped with 43" diameter reels, set 14" above the cutter bar, work best. Bats are set at a wide angle to avoid smashing stalks down below cutter bar. These reel combines proved to be superior to combines equipped with picker-heads which harvested just the ears. The engineers report combines have no trouble handling the entire dwarf corn plants. In fact, topping dwarf corn before combining resulted in

A man has to live with himself so he should see to it that he always has good company.

no harvesting advantage over untopped dwarf corn.

Uneven ear height is still a problem, but so was it with the early normal hybrids. The remarkable standability of dwarf corn contributes to lower harvesting losses through fewer down stalks and dropped ears.

Dwarf corn plants are more efficient grain producers than are normal hybrids. This efficiency is measured by corn breeders with the ratio of pounds of dry matter per pound of grain produced. Tests of *brachytic*-2, at Illinois show it takes only 0.8 pound of stover to produce a pound of grain. Normal hybrids growing in adjacent rows produced 1½ pounds of stover for each pound of grain.

Soil structure can be badly damaged if heavy equipment is used on wet fields in early spring. When this happens, all types of crop plants suffer from lack of oxygen at the roots, and water flows to where it does more harm than good.

There is reason to believe that dwarfs may also make more efficient use of available planting space on a field basis. The *compact* dwarf has the ability to produce high yields at unbelievable populations. This dwarf made its highest yield at 26,000 plants per acre and dropped off only a few bushels when this rate was extended to 78,000 plants per acre.

These yields are made in inbred lines. What they will do as hybrids is not known, but indications are that as *compact* hybrids they will react similarly or perhaps better. At these high populations, stress on the plant reaches the point where it becomes important that plants are evenly spaced. This means every plant is an equal distance from every other plant in all directions. It is safe to predict that if this *compact* dwarf ever reaches commercial production, we will make some major changes in our corn production methods.

In 40-inch rows as we now conventionally plant corn, dwarfs are recognized as a potential nurse crop for legume seedings. Excellent legume stands have been obtained in some trials, but complete failures have also resulted in other trials. More research will develop this practice.

Up to this time, no plant breeder—either college or commercial—has announced development of a dwarf hybrid which yields as much as conventional hybrids now being grown. But they are close. Illinois yields are only 10% below normal hybrids.

In time, it may be possible to incorporate dwarfism in some high-yielding lines which are not now in production, and overcome this deficit in yield.

Corn Production Tips

Before you plant corn, consider these recommendations from the Wisconsin Pacemaker Corn Program . . .

Condensed from University of Wisconsin Agronomy Department Release

FOR a successful and profitable corn project you must consider a complete management program.

Every one of the steps listed below is very important. The step that you overlook may become the step that limits your production.

The applying of a large amount of fertilizer will not pay if you do not get a good plant stand or if you do not control the weeds.

The following are the steps for a successful corn project:

1. Select a good field and test the soil.
2. Apply recommended fertilizer properly.
3. Prepare a good seedbed.
4. Plant seed of a good hybrid of the proper maturity.
5. Have adequate plant population.
6. Control insects.
7. Control weeds.
8. Harvest dry corn.

Select Field & Test Soil

When selecting the site for your corn project, select a field which has a good fertility level and that is well drained. A field that has been in legume sod is best. Before plowing, if possible, sample the soil and have a soil test made. Do this early so that fertilizer can be broadcast before plowing if a large quantity is required.

You many want to consider the recommendations which were made by the Wisconsin Pacemaker Corn Program. The objective of this program was to supply a sufficient amount of plant food for 100 bushels of corn per acre. Your county agricultural agent or vocational agriculture instructor can give you the details on this requirement for your area.

Apply Recommended Fertilizer

Your soil test will give you the amount of lime and commercial fertilizer that is needed. Check the requirement carefully before plowing. It is best that the lime and broadcast application of fertilizer be applied before plowing. The use of barnyard manure is

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recommended and should also be applied before plowing. Disc in the manure and broadcast fertilizer before plowing. This practice will give you better mixing and require less soil preparation after plowing.

Poor placement of starter fertilizer can reduce your corn yield. The fertilizer should NOT be applied so that it is in contact with or above the seed. The fertilizer must be placed at the side of the seed. Check and clean the fertilizer shoe on your planter so that you will get maximum separation of the fertilizer and the seed. The fertilizer should be drilled in even if the corn is being checked. Lim-

Good soil management that maintains and builds up organic matter in the soil is mighty good insurance against crop losses in dry years.

it your starting fertilizer application to 250-300 lbs. per acre on heavy soils and 150 lbs. per acre on sandy soils. When nitrogen is needed sidedress before the corn is 12 inches tall.

Prepare A Good Seedbed

Today there are two methods of soil preparation that are being used for corn. One, the conventional method of plowing and cultivation; second, the minimum tillage program more commonly known as "wheel track planting."

The conventional method of soil preparation is to plow and then prepare the seedbed through a combination of operations with the use of the disc, field cultivator, spring tooth harrow, etc., until a mellow but a firm seedbed is obtained.

In the wheel track method of planting, corn is planted on freshly plowed ground. The seedbed is prepared by the wheels of the tractor thus eliminating the field cultivation before planting. For further information consult reports on wheel track planting.

Select Proper Seed Corn

Choose a variety that will mature in your area. The feeding value of the ear corn that you produce will depend on the number of bushels and on the quality of the corn. So strive for corn that can be cribbed safely and will remain sound and be free from mold and rot.

High Population Desirable

Adequate plant population is necessary for a high yield. However, the plant population must be adjusted to the soil type and fertility, moisture level, and weed problem. Thus plant population will vary from farm to farm. Depending upon local conditions, a plant population of 13,000 to 17,000 plants per acre is desirable.

When planting corn in a 40-inch row, to plant 13,000 kernels per acre the kernel spacing is 12.1

inches apart in the row; 14,000 kernels, 11.2 inches; 15,000 kernels, 10.5 inches; 16,000 kernels, 9.8 inches; and 17,000 kernels, 9.2 inches. Usually there is about a 10 per cent reduction in the number of mature plants compared to the number of kernels that are planted. When hill dropping two kernels per hill, the spacing is twice as great to obtain the same population. To make proper planter adjustments consult the instruction book for your planter.

Before planting, select the proper plates, compare the kernel size and the cell opening. If improper plates are used, stands may be too thick or too thin. Driving too fast when planting will cause skips and bunching, so drive 2 to 3 miles per hour or at walking speed. Remember, plant population is important. You can't get high yields without sufficient plants per acre.

There isn't enough energy and dry matter in new grass to keep a cow's weight and production up unless she is given hay and silage in addition.

Weed Control Essential

Corn is a poor competitor with weeds so keep the field as clean as possible. This can be accomplished with cultivation or a combination of cultivation and the use of chemicals. With the use of chemicals we usually reduce the number of cultivations. Never cultivate too close or too deep. When roots are cut or injured the productive capacity of the corn is reduced and a place of entry for stalk rot organisms is provided.

Broadleaf weeds can be controlled with 2,4-D. Use an overall spray of ¼ to ½ pound of 2,4-D amine or 1/6 to ¼ pounds of 2,4-D ester per acre when corn is 4-10 inches tall. When the corn is taller, use a drop nozzle. For the control of *annual* grasses and broadleaf weeds, use simazin, as a pre-emergence spray. Based on your soil type, use the following rates of active ingredients per acre; sand, 1 lb.; silts and clay, 2 lbs.; silts and clays high in organic matter, 3 lbs.; and in peats and mucks, 4 lbs. To reduce costs band application can be made. Simazine requires 20 gallon nozzles, course nozzle screens, and good agitation in the tank. It may not be effective if soil is very dry.

Insect Control

Wireworms, seed corn maggots and beetles can reduce your plant population by attacking the germinating seed. To prevent this damage you can treat your seed corn at the rate of 1 ounce of actual dieldrin, lindane, aldrin or heptachlor per bushel of seed.

Make it a point to observe the field during the growing season.

Watch for insect infestations such as cut worm, army worm, grasshopper, corn borer, etc. If any insect problem occurs contact your vocational agriculture instructor or county agent for advice. Treat the field early, before the insect population gets too high and the damage has been done. No control program will restore the loss in yield when controls are delayed. Should any insect problem occur apply practical control measures at once.

Harvest Dry Corn

Allow the corn to dry thoroughly in the field. With present production costs we cannot afford to produce a good crop and then spoil it by cribbing it too early. For safe cribbing as ear corn the moisture level should not be over 21 percent. Place the corn in a crib that keeps out the water and provides ventilation to permit the ears to dry.

To complete your records you will want to know your production. Again, your vocational agriculture instructor or county agent can help you determine the number of bushels per acre.

More Feed Value From Oats Harvested For Hay or Silage

Oats produce up to 50 percent more feed value per acre when harvested for hay or silage than when harvested for grain, according to Wyoming University researchers.

Researchers tested twelve oat varieties. The average silage yield at 75 percent moisture was 16 tons per acre from irrigated land and 6.7 tons per acre from dryland. Average hay yields were 4.4 tons from irrigated and 1.9 tons from dryland acres.

Plots of dryland oats harvested for silage yielded 50 percent and irrigated oats 20 percent more total digestible nutrients per acre than similar plots harvested for grain.

The highest yielding oat varieties for hay and silage in this Wyoming study were Eagle, Fortune, Rodney, and Victory. Rodney, a new oat, was the champion yielder under irrigation, where it produced 18 tons of silage per acre. *—University of Wyoming*

The Castro government is reported to be building several large milking barns near Havana, each with the capacity for more than 1,000 cows. In the past three months, dealers report that the Cuban government has purchased 10,000 dairy cows, most of which have already been moved to Cuba from U.S. sources.

—Western Dairy Journal

Why Use Soil Insecticides?

Damage to corn from soil insects differs from year to year and from field to field . . . but use of aldrin and heptachlor is increasing rapidly. Here's why . . .

Condensed from Iowa Farm Science

Harold Gunderson

LAST year was a "good" one for soil insects. And it was a convincing one for farm operators who left untreated check strips, deliberately or accidentally, in corn fields treated with soil insecticides. High winds and heavy rains early in August made damage, particularly from root-attacking insects, much more obvious.

Iowa farmers have known for many years that harmful insects which attack seeds, seedlings and established corn plants are present in the soil. But 25 years ago about the only way to try to prevent damage was to use judgment in when and where to plant corn. When cutworms attacked, a corn grower could always mix an arsenic-bran bait and broadcast it in the infested field. Sometimes he stopped the damage. More often, he replanted his field after the cutworms matured.

Research was begun about 10 years ago with the new synthetic organic insecticides in the control of soil insects. Two of these, aldrin and heptachlor, became readily available and relatively cheap. The first official recommendations from Iowa State on the use of these materials as soil insecticides were made in 1952. About 25,000 Iowa acres were treated with soil insecticides in that year. Last year, the treated Iowa acreage approached 5½ million acres.

Treat What?

There are 20-24 species of insect pests that make up the total soil insect complex. Some of these are present in every planted cornfield every year. Some are most likely to be abundant in first-year corn following sod. Others, especially the rootworms, are more abundant in second- and third-year corn.

Perhaps the most wide-spread

Reprinted from Iowa Farm Science, Ames, Iowa

damage in 1960 was caused by the three species of corn rootworms:

The northern corn rootworm has been a major problem in fields planted to corn 2 or more years in succession ever since Iowa farmers began planting corn. The adult rootworm beetles are bright green or yellowish tan in color, about ¼ inch long. They begin to appear in cornfields during the first 10 days of July. These beetles feed on corn pollen and corn silks. Sometimes they're abundant enough to interfere with normal pollination of the ear. They can be found in every cornfield in the state. They're strong fliers and move considerable distances.

Females lay eggs until killed by cold weather. Each female may deposit several hundred eggs in the soil in the cornfield. The eggs remain dormant through the winter, hatching in late May or early June of the average year. The young larvae don't move far in search of corn roots on which to feed. And, if the field is planted to some other crop, the worms die of starvation. Finding corn roots, however, the worms tunnel into them, destroying them and opening the way for root and stalk diseases.

The western corn rootworm has entered Iowa only during the past decade, though it had been a corn pest in Colorado, Kansas and Nebraska for a number of years. To date, adult western corn rootworm beetles have been collected only in the western half of the state. They're about the same size and color as the northern beetles but have black stripes on the margins of the wing covers. The life history and habits of the northern and western corn rootworms are similar. But the adult western beetles appear to do more feeding on corn silks and thus may cause greater damage through failure of the ear to pollinate. There's only one generation per year of each of these two species.

The southern corn rootworm is known also as the 12-spotted cucumber beetle. This insect apparently doesn't live through the winter in Iowa but migrates here from the south in spring and early summer. Adult beetles fly into cornfields in large numbers. In some years they've caused serious early damage from leaf feeding. Eggs are placed around the base of a grown corn plant, and the larvae don't have far to go to find corn roots to feed on.

He who has a thing to sell
And goes and whispers in a well
Is not so apt to get the dollars
As he who climbs a tree and hollers.

Observations indicate that each larva of the southern species can do more damage than the larva

Table 1. 1960 results from soil-insect treatments in second-year corn.

County	Treatment	Yield in bushels		bushels
		Treated	Untreated	Increase
Adair	2 lbs. aldrin, broadcast 1959	118	89.5	27.5
Henry	2 lbs. heptachlor/A., broadcast 1959	79.3	62.8	16.5
Dallas	1 lb. aldrin or heptachlor/A., broadcast 1960	111	83	28
Guthrie	½ lb. aldrin/A., row treatment 1960	98	82	16

of either the northern or western species. There may be several generations of the southern species in Iowa during the summer, and the larvae feed on the roots of a number of crops.

Thus, corn rootworm feeding results in several kinds of losses. The damaged root system of the corn plant isn't able to absorb enough plant food to produce the best ear. Wounds made by the larvae open the door for root and stalk rots. The reduced root system also means a less firm anchoring for a corn plant to withstand wind damage in late July or August. Wind lodging will increase the amount of corn left in the field and may also lead to harvesting problems. Even with no wind or rain damage, rootworm-damaged corn, with its reduced root system, is more likely to pull out of the ground as a picker moves through the field—increasing clogging and the accidents which accompany corn picker cleaning.

If adult beetles are abundant at pollination and silking time, they can prevent normal pollination by eating off the silks as fast as they emerge, and the resulting unfilled ears represent an additional loss. Applications of soil insecticides don't control adult beetles that fly into the field but do prevent emergence of adult beetles from the soil.

Why Use?

Why has the use of soil insecticides increased so rapidly since 1952 in Iowa? Avoiding yield losses from soil insect damage undoubtedly is one of the reasons. Tests at Iowa State and farm experiences have shown the value of soil insecticides in this regard. Table 1, for example, shows the yield results from four fields of second-year corn where growers left untreated check strips for comparison in 1960. Some of the other reasons are indicated in talking with farm operators who have used soil insecticides.

Many corn growers have had the experience of trying to pick badly lodged fields, and they want to avoid this problem if possible. Most Iowa farmers, at one time or another have had to replant fields damaged by seed corn mag-

gots, seed corn beetles, wireworms, white grubs or cutworms, and the cost of replanting is as great as or greater than the cost of using a soil insecticide.

The two most commonly used soil insecticides, aldrin and heptachlor, have given about equal results in controlling the total group or complex of soil insects that damage corn in Iowa. In our tests, we've gotten the best control of the greatest number of hard-to-kill insects by broadcasting 2 pounds of actual aldrin or heptachlor per acre on plowed ground and working it into the soil immediately.

Soil insect damage—and, therefore, the relative value of soil insecticides in preventing damage isn't consistent from year to year. But the soil insecticides we've mentioned offer effective control of the soil insects that damage corn. So it appears that Iowa farm operators are increasing their annual use of soil insecticides partly as a form of insurance to protect their investment in the crop and to obtain the greatest return from it.

Applying Limestone Where Needed Helps Keep Soils Fertile

Lime is probably the cheapest plant food available and one of the best insurances for good crop production, according to Dr. W. L. Pritchett, soils technologist with the Florida Agricultural Experiment Station.

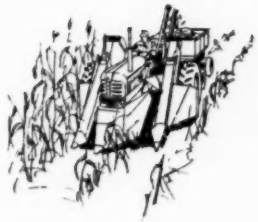
Applying limestone to soil that needs it has been called the first and most important step in restoring or maintaining soil fertility, adds Dr. Pritchett. He says only a relatively small percentage of farmers use adequate amounts of lime to maintain soil reaction at a level best for plant growth.

In addition to neutralizing soil acidity, limestone plays a number of other roles in the soil. It is the cheapest source of calcium and magnesium, both of which are essential plant nutrients often deficient in soils. Lime also promotes the availability of other plant nutrients and increases the efficiency of fertilizers.

Lime also encourages favorable bacterial activity, such as nitrification, and improves the structure of some soils, but not all soils need liming. Guard against the effect of over-liming. For an accurate check on the liming needs of soil, take soil samples and have them tested.

—*Florida Agricultural Experiment Station*

You Can Rocket To High Corn Production



Your goal may not be the moon but these tips will help you make bigger yields . . .

Condensed from Michigan Farmer
Lynn Robertson

WHETHER you're a grower of corn or a maker of modern rockets, there's one thing you need—and that's efficiency.

It takes about 50 bushels per acre of your corn yield to pay production costs. The investment in a rocket varies according to size, but is always high. So in either growing corn or building a rocket, it is important that it be a profitable venture—that it gets into the profit orbit, so to speak.

To apply the modern terms involving rockets to the corn-growing enterprise, you can use a countdown, by 4 stages, to help determine your efficiency. This will consist of a series of questions. If you answer all of them with a YES, then you're making the most of opportunities for profit. They go as follows:

Stage 4

20. *Drainage*—Are the fields well-drained and are tile and ditches effective so that tillage and planting can be done on time?

19. *Erosion*—Have cover crops been used at every opportunity to prevent splash erosion?

18. *Organic Matter*—Are green manure crops, livestock manure, and crop residues used effectively? Organic matter is still the "life of the soil," even in the rocket age.

17. *Lime*—Has the soil been tested within last 4 years? Phosphorus availability is low on an acid soil.

16. *Rotation*—Is the sequence of crops such that corn is not exposed to insect and disease problems? Is the rotation one that creates a desirable physical condition of the soil?

Stage 3

15. *Soil Samples*—Are representative soil samples (a composite taken to represent not more than 10 acres) taken for soil testing? A poor soil sample results in

Reprinted by permission from Michigan Farmer, 322 Abbot Road, East Lansing, Michigan

unreliable fertilizer recommendations.

14. *Fertilizer Recommendations*—Do you follow the recommendations that have been made on the basis of soil tests? Soil tests, while not perfect, are reliable indicators of the fertility status of a soil.

13. *Fertilizer Grade*—Do you buy the correct grade for the kind of soil that you have? Use fertilizer for only one reason—to furnish nutrients that the soil does not have the ability to supply.

12. *Fertilizer Rate*—How much fertilizer should be used? A rocket can't hit the moon on a half a tank of fuel, and you can't get a full yield on half the amount of fertilizer recommended.

11. *Fertilizer Placement*—Does your corn planter still have the old-fashioned split-boot fertilizer applicator? After it becomes worn the split boot places fertilizer in contact with the seed, thus retarding or reducing germination.

Stage 2

10. *Tillage*—Is minimum tillage used? Minimum tillage is beneficial on most soils.

9. *Hybrid Seed*—Is an adapted hybrid used? Plant a hybrid that has been tested, treated with fungicides and proven to be good in your community.

8. *Planter Speed*—Is your planter designed to be used at high speeds? Most planters, even some of the newer models, plant more uniformly at slower speeds.

7. *Populations*—Is the population adequate for the kind or soil you have and the fertilizer used?

6. *Planting Time*—Is planting done on time, thus taking advantage of extra yield from early planting?

Stage 1

5. *Weeds*—Do weeds restrict your yields? Chemical herbicides can cut the number of cultivations needed.

4. *Timely Harvest*—Have you ever estimated your harvest losses? Losses of 5 to 20 bushels per acre are not unusual, with loss greater the later the harvest.

Profit figures tell farmers more about the business of growing corn than yields do. To get high profits, a farmer must keep a close eye on costs in relation to yields. This means: (1) Paying attention to the fertility needs; (2) Adjusting corn planting rates to fertility resources and moisture, and (3) Using weed and insect control and other good management practices.

3. *Picker Adjustment*—Do you adjust your picker to the condition of the corn at harvest time to reduce harvest losses?

2. *Yield Estimate*—Do you esti-

mate yield of a field in order to improve production efficiency?

1. *Records and Plans*—Do you keep records of soil tests, lime and fertilizer use and other test results for each field? Do you note on your records problem areas, deficiency symptoms, unusual weather, weed, insect and disease problems, tillage used and other observations to help plan future crops?

0. *Blast Off!*—Are you ready?

If your answers have been YES to the foregoing questions, if you recognize, evaluate and control those factors, then you're ready to "blast off" to highly efficient corn production. As with a rocket, if you slip up on one or more of the factors or stages, in-efficient production or failure results. Control them all and get the most from your investment in corn production.

Multiple-Ear Corn

First it was hybrid corn—now it is multiple-ear corn!

An Illinois hybrid corn company has announced plans to market a new type of corn that is said to increase per acre yields 20 to 25%. Each plant would produce up to 10 small ears, rather than the single large one grown on most present stalks.

The new plant stems from long research during which modern corn was crossed with a primitive type—teosinte—that grows wild in Guatemala.

The new ears, about two inches shorter and half as thick as present ones, are not being bred for human consumption. Two types have been developed for marketing—one designed for combine harvesting and the other for those interested in corn silage.

The company says the new multiple-ear corn could produce 200 bushels of corn an acre under good growing conditions. Farmers seldom obtain more than 150 bushels per acre with the types of corn being used today. —*New Jersey Farm and Garden*

● An article in a recent issue of the *Wall Street Journal* sheds light on a new sales outlet for corncobs—mouse mattresses. It seems an Illinois company grinds cobs into a popcorn-like material which it sterilizes and sells to research centers. Scientists use the material to bed down their laboratory mice. The company grinds up the cobs from 20,000 bushels of corn each month, and reports volume last year was triple that of 1958. A 50-pound bag brings about $2.75.

—*Business Farming*

Chimney Smoke

by Irene Rudie

I saw God wash the world last night.
Ah, would He had washed me
As clean of all my dust and dirt
As that old white birch tree.
—William Leroy Stidger

★ ★ ★

Comforting thoughts during a thunder storm: If you hear the thunder, the flash is past and can't hurt you; if you see the flash it can no longer strike you; if you should be struck by lightning, you'd never know it!

★ ★ ★

Most of us don't have the courage to throw away a perfectly good kitchen tool even though it is never used. The cutter of curly spuds and the clumsy can opener take up valuable space in a drawer—until a rummage sale comes along. That's why women love rummage sales.

★ ★ ★

A neighbor gave a small visitor a frosting spoon to lick. When the spoon was clean, the child handed it back and asked for "more lickker."

★ ★ ★

Modern artists who put two wide-open eyes on a profile portrait must be children at heart. Little children are bothered by the usual one eye on a profile and want to know where the other eye or other ear is.

★ ★ ★

When an auction bill describes a horse as "smooth mouthed", it means his age is not to be revealed. Something like "legal" for a woman's age.

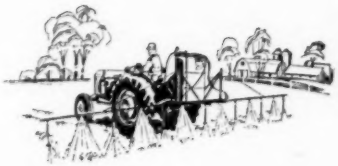
★ ★ ★

Did you know that 1961 is a special kind of year in that it reads the same turned upside down? The last such year was 1881, and before that, 1691. None of us will be here to see the next one, 6009.

★ ★ ★

A four- or five-year-old can drive a mother almost out of her wits with his endless "Why, Mommy?" But it's his business to learn about the world in which he lives, and mother's business to give him the right answers . . . an important vocation it is to mold a man.

Understanding And Calibrating Your Farm Sprayer



Your farm sprayer will only apply chemicals in the right amounts where you want them if it is properly calibrated. Here's how . . .

Condensed from Kansas Farmer
Howard C. Hanson,
Hanson Equipment Company

YOUR farm sprayer is a precision-built machine designed to apply farm chemicals safely, efficiently and economically. You will find it must be operated and maintained properly for best results.

Since sprayer nozzles eventually wear due to abrasive and corrosive actions of chemicals, you should calibrate your sprayer periodically. Worn nozzles can increase their discharge over their original rating by as much as 100 percent and produce inaccurate and injurious applications.

Calibrating Your Boom Sprayer

Application rate of your boom sprayer depends upon: (1) Size and number of nozzles on the boom; (2) nozzle spacing and operating height of the boom; (3) operating pressure; (4) speed of travel. In addition, viscosity or thickness of solution can affect its flow. If your solution is considerably thicker than water, you should use the actual solution in your calibration for accurate results.

First, determine tractor speed as follows:

1. Measure off a specified distance (300 to 500 feet), and place a marker at each end.

2. Measure the time it takes, in seconds, for your tractor to travel this distance at reasonable throttle setting.

3. Multiply distance by .682 and divide sum by number of seconds required for travel in step 2. Result is speed of your tractor in m.p.h. at throttle setting used.

Example: Your tractor covers 300 feet in 50 seconds; therefore, 300' times .682 divided by 50 seconds equals 4.1 miles per hour (m.p.h.).

Calculate Nozzle Discharge

Next, calculate the nozzle discharge in this way:

Reprinted by permission from Kansas Farmer, 8th and Jackson Streets, Topeka, Kansas

1. Time the seconds necessary for one nozzle to fill a 1-pint jar and divide into 7.5. Resulting figure is gallons-per-minute (g.p.m.) discharge of that nozzle. Example: It takes 25 seconds for 1 nozzle to fill a 1-pint jar; 25 seconds into 7.5 equals .30 g.p.m.

2. The g.p.m. of your boom is the total discharge of all nozzles. Example: A 21-foot boom has 13 nozzles on 20-inch spacings; therefore, 13 times .30 g.p.m. equals 3.9 g.p.m. (total discharge of boom).

Now, you can determine your gallons-per-acre (g.p.a.) discharge with this simple formula: 5,940 times gallons per minute per nozzle, divided by nozzle spacing in inches times m.p.h.

Example: 21-foot boom; 13 nozzles at 20-inch spacing; each nozzle discharges .30 g.p.m. at 40 p.s.i.; tractor speed 4 m.p.h.; therefore, 5,940 times .30 divided by 20 times 4 equals 22.3 gallons per acre.

Experience is not what happens to a man. It is what a man does with what happens to him.

Calibrating your Boomless Sprayer

1. Measure into a sprayer tank 25 to 30 gallons of water using a 5-gallon bucket.

2. With 40 p.s.i. operating pressure, tractor speed at 4 m.p.h., spray a swath and measure its over-all width. Divide swath width into square footage of an acre (43,560). Example: At 40 p.s.i., 4 m.p.h., actual swath width is 50 feet; therefore, 43,560 divided by 50 feet equals 871.1 feet.

3. Set throttle at 4 m.p.h. and travel 871 feet with your boomless sprayer operating at 40 p.s.i. At end of run, measure amount of solution used. This amount will be your gallons-per-acre (g.p.a.) application rate at speed, pressure and swath width noted above.

How to Change Your Gallonage Per Acre

With both the boom and boomless sprayer, you get less gallonage by increasing the speed, lowering pressure or using smaller nozzles. You get more gallonage by decreasing speed, increasing pressure or using larger nozzles.

Sprayer nozzle manufacturers provide complete gallonage data for each boom and boomless nozzle they make. These charts indicate the rated g.p.m. of each nozzle at specific pressures and indicate g.p.a. rating for each nozzle at specific speeds and pressures. In addition, pertinent data on nozzle spacing, spraying height, and spray angle also is included. From these charts. you can choose the right spray nozzle for every spraying job.

Proof That Pigwifery Pays

Don't let the ladies see this article. They may take over your swine business . . .

Condensed from Farmer and Stock-Breeder

Anthony Phelps

TWO people who are firmly convinced that the profit from pig farming is made in the farrowing house rather than in the fattening pens are Miss E. M. Thomas, owner of the 50-sow Woodlodge herd of Large Whites at Woodlands, near Southampton, England,and her herdswoman, Miss Susan Bradley.

The whole of the management of this herd is aimed at a single goal—larger litters. For Miss Thomas is convinced that prolificacy is influenced more by environment and management than by breeding.

The herd's vital statistics for the last 63 litters produced are an average of 12 born and 10 reared. Last year it was higher—13 born and 10.5 reared—and included one quite incredible period during the summer in which 19 litters totalled 290 pigs, an average of 15.26 pigs born alive.

What are the secrets of producing something like six or seven more pigs per sow per year than the average on a perfectly unpretentious little farm with nothing special for buildings and heavy land which is wet for most of the year?

If it is possible to sum the thing up briefly it is, quite simply, individual attention to each sow during pregnancy, while actually farrowing, and while feeding the litter.

Dry sows are kept in roomy concrete yards with large timber ex-railway containers to sleep in, and they can be let out to grass when the land is fit. Each sow gets five to six pounds of feed daily, fed in rather an unusual way.

Porridge Portions

The meal, which is home mixed, is mixed to a stiff, porridgy consistency, and is tipped out in small portions all round the perimeter of each yard. This method has been found far superior to the use of troughs in eliminating bullying and preventing the boss

Reprinted by permission from
Farmer and Stock-Breeder, Dorset House, Stamford Street, London, S. E. 1

sows in the herd depriving others of their fair share.

Miss Thomas is convinced that ensuring each sow has the correct amount of food throughout pregnancy is just as vital as ensuring that the ration is of a high quality. Although the sows all get basically the same daily ration, extra is given to any individual showing signs of loss of condition, and an eye is kept on the herd at feeding times to ensure that no sow goes short.

The sows live in one yard, and the gilts in-pig for their first litters live in another. If a sow is seen to be having rather a tough time among the senior members of the herd she is transferred to the gilts' yard to give her morale a boost and to enable her to get her food more easily against less competition.

These are the sort of factors Miss Thomas and Miss Bradley

Your word is one thing you can give, yet always keep.

mean when they talk about individual attention. They also include such factors as the close supervision of matings. It is currently popular to believe that a sow needs serving two or more times during her heat period to ensure the conception of a large litter.

But at Woodlands Lodge Farm it has been found that one good service is enough. A second service is only required if the first one has not been performed correctly.

Good health among the herd is considered a pre-requisite for successful breeding, and Miss Thomas believes in having her local vet as a frequent visitor to advise on health in general.

As she says, you cannot keep fifty sows, three or four boars, and large numbers of small pigs in a fairly small space without experiencing some disease problems. The only way to minimize such trouble is to meet it rather than wait for it.

The two ladies are aware of the controversy over attending sows while they are farrowing, but to their minds there is no question about it—pigwifery pays.

One of them is always on duty, day and night, to take an active part in the farrowing operation—calming the sow, drying the pigs, and even assisting in the delivery of pigs if necessary. A long delay between the arrival of piglets usually heralds the birth of a large pig which causes the sow considerable pain and it is usually born dead. In this sort of case they believe in speeding up delivery.

Farrowing Help

On countless occasions piglets born in their envelopes, with their snouts choked with membranes, or arriving hind legs first have been saved from suffocation. All

piglets are placed in a box under an infra-red lamp as they are born to dry off and gather strength. Miss Thomas reckons that, on average, she may save two pigs in each litter with the help she is able to give during farrowing.

The complete trust and docility of the stock which this high standard of stockmanship inspires is an important economic factor in the running of a herd of this size. All the sows can be moved about the farm without difficulty, time is never wasted dealing with recalcitrant animals, and small pigs can be handled, dosed, injected and even castrated in the farrowing pens without removing the sows.

Miss Bradley would no more dream of taking a stick and a board into a boar pen than she would a bottle of gin to a tea party.

Each farrowing pen is fitted with rails, a creep and an infra-red lamp and these, together with the quietness of the sows themselves, virtually eliminate losses through overlying. An average of two pigs is lost from each litter, and the main cause of this is quite simply the large number of pigs born.

Every effort is made to farrow the sows in small batches and to swing pigs from a large litter on to a sow with a small litter. The problem is—so very few small litters. When four or five sows all come down with 14 or 15 piglets at the same time no such switching can be effected.

Sow-milk substitutes have been employed in the hope of hand-rearing pigs which cannot feed from the sow, and this could provide the solution to the problem, but no success has yet been experienced.

Despite the large number of pigs born in each litter there has been no evidence that individual pig size is suffering from this.

Apart from stock for breeding, all weaners are sold to local fatteners. In the past they were sold on a weight basis, but this involves extra work and most customers are now regulars who know the size and quality of the pigs they are getting, so they are content to pay the level price Miss Thomas asks.

One farmer may take care of 50 milking cows today when he could handle 15 to 20 in 1939.

In this age of statistics, work study, automation and integration, the fact that pigs are living creatures gets sometimes rather overlooked. We need the successes of people like Miss Thomas and Miss Bradley to remind us occasionally that, in the end, it is stockmanship which really counts.

Moldy Corn

Moldy corn can be fed with relative safety to most classes of livestock. However, there are several practical points which should be considered. Moldy corn does not have the feed value of normal corn because the animals may not eat it as well and the feed value of each pound is less. Therefore, milk production, growth or rate of gain may be less than normally expected. Moldy corn, in some instances, can cause illness or death of animals because of toxicity.

These recommendations are made to answer your questions:

1. Feed some moldy corn to 2 or 3 of the animals for at least two weeks to determine if the corn is safe. If no abnormal effects are observed, the moldy corn is probably safe for that kind of livestock. There is no laboratory test which will determine the safety of moldy corn for livestock feeding.

2. Moldy corn should never be fed to sheep, horses or ponies.

3. Feed out the moldy and high moisture corn before warm weather arrives. If ear corn is fed free choice, the animals will tend to select the best ears and leave the badly molded ones. The badly molded ears should be removed from the fed lot and burned or buried. It is best to use the moldy corn for market animals, especially hogs. (If it is necessary to feed moldy corn to breeding cattle or hogs, it should be mixed with other normal feeds. When fed to dairy cattle, extra grain mixture may be needed to maintain high production.)

4. Corn that will be held for spring and summer feeding should be mechanically dried and properly stored before warm weather arrives. This corn should be test fed for safety as described in number one before drying and again after drying but before feeding.

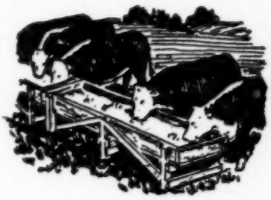
5. Ensiling moldy corn is not known to make it less toxic or more desirable as livestock feed. There is little or no experimental evidence or practical experience to guide us in making specific recommendations. Test feeding of moldy corn should show it to be safe before ensiling. It should also be test fed again before using for livestock feeding.

6. There is no chemical treatment or additive that offers a simple solution to the problem. Routine treatment with mold inhibitors is not recommended.

7. If animals become sick when fed moldy corn, the moldy corn should be removed from the ration immediately. Changing feed will often correct the trouble. However, early diagnosis and treatment by your veterinarian may help decrease the severity of the problem. Animals that have advanced mold poisoning *cannot* be cured.

—*Wisconsin State Department of Agriculture*

Pelleting Feeds For Beef Cattle



There is a trend toward this practice. This article tells why and lists advantages and disadvantages . . .

Condensed from
Sunshine State Agricultural Research Report
T. J. Cunha, University of Florida

MOST cattlemen are interested in the possible use of pelleted feeds.

They want to know how practical and economical they are and when they should be used. The answer is that pelleted feeds definitely are of value in cattle feeding and in most cases will increase animal response.

The big question is, will the additional response obtained pay for the added cost of pelleting? Some times it will and other times it will not. As new engineering developments occur with pelleting equipment, the cost of pelleting will pay in many cases. Thus, the economics involved will determine how extensive the pelleting of feeds will be used in the future. There is no doubt, that pelleting of feeds has many advantages and that it will be used increasingly in the future. In fact, some feed companies already have many of their feeds available in both meal and pelleted form because of the demand for pelleted feed by many livestock and poultry feeders.

Facts About Pelleting

There is still need for much more research on pelleting feeds for beef cattle. Many questions are still unanswered. However, from the research conducted to date the following facts seem to be established:

1. Pelleting increases intake of roughages. This is especially the case with low quality forages. This may be due to a faster passage of the roughage through the digestive tract. Part of it may be due to the fact that the feed is compressed and thus the animal can accommodate more feed in its digestive system. Pelleting also increases the palatability of lower quality roughages. When an animal consumes a larger quantity of feed, then a larger percentage of it goes for gain and a lesser percentage for body maintenance.

2. Pelleting seems to speed up

Reprinted from Sunshine State Agricultural Research Report,
Agricultural Experiment Stations, University of Florida, Gainesville, Florida

the passage rate of the roughage through the digestive tract. It is possible that the fine grind of the roughage is responsible for this. This may make it possible for the roughage to leave the rumen at a faster rate and thus explain part of the large intake of feed when pelleted.

3. Pelleting does not seem to improve the digestibility of a roughage. Actually, there is some research information to indicate that digestibility may be decreased slightly. The faster passage of the roughage through the digestive tract may account for slightly lower digestibility. The high temperature and pressure required for pelleting may also influence the digestibility of the feed.

4. Pelleting improves low quality roughages more than high quality ones. This is probably due to the increased feed intake, since poor quality roughages are usually consumed at lower levels.

Prevents Waste

5. Pelleting prevents the sorting out by animals of the more unpalatable parts of the feed. Cattle usually waste a considerable part of the hay and usually leave behind the coarse stems and any weeds which it may contain. In some cases, the waste might be as high as 30-40% of the hay, depending on its quality. Thus, pelleting prevents waste of hay and other constituents of the ration which might otherwise be unpalatable.

6. Pelleting will prevent wastage of the valuable leaves of hay. This can be a very important loss, depending on how the hay is fed and how easily the leaves fall off.

7. Storage space requirements are reduced considerably. This can be quite an important saving and especially with large feeding operations.

8. Pellets are suited for mechanical feeding or self-feeding. This will become of increasing importance in the future as more and more of our feeding operations become highly mechanized as a means of saving on labor costs.

9. Roughage pellets can be more easily and accurately mixed with the concentrates in the ration. This will allow for complete ration control in the proportion of roughage to concentrates which one might wish to feed. This can be very important in making maximum use of roughage in the rations fed animals. This will mean that the cattle will be eating a completely balanced ration every time they eat a mouthful of feed.

Poultry feathers are almost pure protein. They can be processed into protein for livestock feed.

Less Concentrate Needed

10. Less concentrate feed is needed in a completely pelleted ration. With a completely pelleted ration, the cattle do well with higher levels of roughage in the ration. About 20 to 30% of concentrates with 70 to 80% roughage gives excellent results when pelleted. However, when higher levels of concentrates are fed the beneficial effect of pelleting decreases. When the concentrates make up a large part of the total ration, pelleting will usually decrease the intake of feed and rate of gain, although feed per pound of gain may still be increased. There is much yet to be learned on proper ratios of concentrates to roughages with different kinds of cattle and with different feeds. Just why pelleting is more beneficial with high roughage to concentrate rations and not with high concentrate rations is not entirely understood.

11. Pelleting increases rate of gain and feed efficiency. This increase is the greatest with poor quality roughages as compared to high quality roughages and with high-fiber feeds as compared to low-fiber feeds.

12. Animals may go on feed faster and stay on full feed better. There is still some question as to whether this will be true in the majority of cases. Undoubtedly, this will be influenced by many factors, including the roughage used, its level in the ration, the fineness of grind and kind of pellet, the kind of cattle, etc. More research is needed on this point.

13. Pelleting reduces dustiness in handling and feeding. This is a very important advantage with certain kinds of rations and feeds.

14. Animals fed a pelleted feed ruminate or "chew their cud" less. This may increase feed conversion since they save the energy normally spent on rumination. Whether a lack of rumination has any other bad or good effects on an animal is not known.

15. Pelleted feeds are much easier to feed under range conditions. The use of pellets simplifies many of the problems of feeding grains, protein supplements and/or hay on the range.

Each farm worker represents an investment of about $27,000.

Disadvantages

Some of the disadvantages which might be cited for pelleting based on present knowledge are:

1. The extra cost of grinding and pelleting is higher than the benefits derived in many cases.

2. Fine grinding of roughages may decrease the butterfat content of milk produced by beef or dairy cows consuming such roughages even though it is pelleted. More study is needed to more adequately answer this problem.

3. Rumen parakeratosis (in-

flamation of the rumen wall) may occur when a high level of pellets is consumed. There is some recent Georgia Agricultural Experiment Station data which indicates the possibility that the fine grinding of feeds and not the pelleting is responsible for the rumen parakeratosis. This problem needs more study to determine if it will occur with different rations and with varying concentrate-to-roughage ratios.

Very little information is available on wafering feeds for beef cattle. What little work has been done indicates possibilities for this method of roughage feeding. Much more research information is needed in this field. Most of the problems cited for pelleting would also apply to wafering.

Summary

Pelleting of feeds for beef cattle is definitely of value and on the increase. As engineering developments occur which will make pelleting less costly there will be a wider use of pelleting with beef cattle feeds. There are still many unanswered questions on the pelleting and wafering of feeds for beef cattle. These are discussed in this article and need to be answered before pelleting and wafering of feeds can be fully evaluated for beef cattle feeding.

Suffice it to say, however, that an all-pelleted ration for beef cattle is now a reality and future research will undoubtedly supply the answers needed for the problems involved in making this method of feeding possible. It should be stressed that pelleting is no substitute for a well-balanced ration. The essential nutrients will still need to be contained in the pellet for it to do the job intended.

Dairy Researchers Add Hay To Corn Silage Ration: Boost Production

University of Illinois research indicates that dairy cows on corn or sorghum silage should also receive at least one pound of hay per 100 pounds of body weight.

By adding alfalfa hay at this rate to a ration that had previously consisted entirely of corn silage and ground shelled corn, University of Illinois researchers boosted production of 10,000- to 12,000-pound producers by as much as 1,600 pounds of milk per lactation.

Dairy scientist J. H. Byers says cows on the corn silage-ground shelled corn ration had digestive trouble when fed only ½ pound of hay per 100 pounds of body weight. —*University of Illinois*

FUN ON THE FARM

A Collection of Jokes and Humorous Farm Stories

A farmer whose corn crop had done poorly decided to "borrow" a few bushels from a neighbor. On a dark night, the farmer and his eight year old son headed for a distant corner of his neighbor's field carrying several bushel baskets. When they reached the fence separating the two farms, the farmer looked furtively to the right, to the left, ahead and behind. Just as he was about to step into the heavy laden acres of corn the tense silence was broken by his small son. "Daddy," said the youngster, "you didn't look up!"

D.H.I.A. Cow Scope

★ ★ ★

Little four-year-old girl looking at a Holstein cow: "Lookie mother, she has four milkers."

★ ★ ★

A doctor, called at a farm house one night, hurried through the door-yard, tripped and fell heavily. An irascible man, he jumped up and began to swear loudly.

While he was blaspheming, the farmer opened the front door. For a moment he listened in awe and amazement. "Well, I'll be durned, Doc," he drawled finally. "I never knowed before that them Hippcratic Oaths you fellers go in fer was so much like the ones us laymen use."

Wisconsin R.E.A. News

★ ★ ★

Little boy's definition of dust — mud with the water squeezed out.

★ ★ ★

A government official instructed the old farmer to collect his stock of every description and have them branded.

"I suppose that's all right," sighed the farmer, scratching his head, "but honest, mister, I'm going to have a terrible time with them bees." *Hoard's Dairymen*

★ ★ ★

After an exceptionally long spell of good weather, a farmer, well-known for his pessimism, was standing in his field gazing sadly at the bumper crop.

A car stopped and the driver leaned out to congratulate the farmer on the fantastic growth of produce.

"Yes, it's true," the farmer lamented, "the vegetables are big-

ger and better than ever, and the wheat is coming along well enough, but just think how it's exhausting the soil."

★ ★ ★

A feed store is the only place left where you can get a chicken dinner for a dime.

★ ★ ★

In Yonkers, New York, a taxpayer sent the Internal Revenue people 25 cents with a note saying he understood he could pay his income tax by the quarter.

★ ★ ★

Service Station—a place where you fill the car and drain the family.

★ ★ ★

A housewife, shopping in a super market, was complaining to the manager about the high food prices.

"Fifty-nine cents for this small jar of honey!" she exclaimed. "I never paid more than 39 cents for it in my life."

"I know," replied the weary grocer, "but now the bees are demanding petal-to-petal pay."

Badger Farm Bureau News

★ ★ ★

The easiest way to keep up with the Jones family down the road is to listen while their children talk.

★ ★ ★

A jaunty salesman parked his foreign sports car in front of a village store and went in. When he came out, a farmer was looking the car over.

"Well, what do you think of it?" asked the salesman.

The farmer replied: "Picked that one 'fore it was ripe, didn't ya?" *Implement & Tractor*

★ ★ ★

Income Tax: The fine we pay for reckless thriving.

★ ★ ★

I was mired axle deep on a muddy Vermont road. A farmer came out with shovel and farm tractor to help get me out, and as he dug a few shovelfuls of mud away from the back wheels of my car I said to him, "It's mired pretty deep. Do you think you can pull it out?"

He replied, "Heck, yes, ya ain't stuck bad yet! If the roof of that 1959 Ford Hardtop yer back wheels is settin' on don't cave in, I'll get ya out of there quicker 'an ya can say "Scat'." —*Olive Wiley In American Agriculturist*

★ ★ ★

The main difference between men and boys is the cost of their toys.

★ ★ ★

After weeks of painstaking effort, a hunter taught his retrieving dog to bring back ducks by walking upon the surface of the water rather than swimming out after them. He wished to show off this wonder dog to a friend, so without a word about it they went

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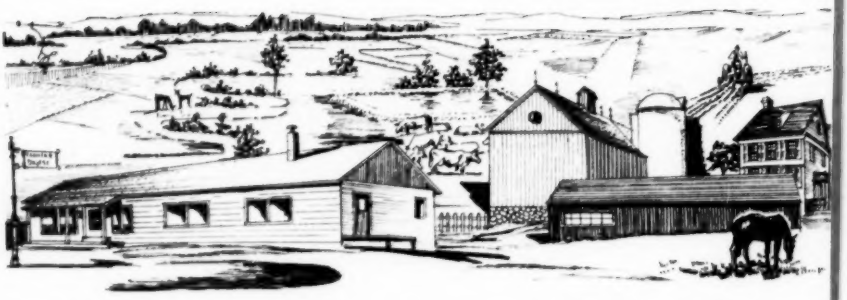

Here's a sketch of our farm where we publish Farmer's Digest. Our 200-acres are planted to corn, alfalfa, grass and trees. We farm — and we publish our magazine on a farm — because we believe that's the only way we can know what other farmers want to read. Farmer's Digest is probably the only farm magazine in the world published on the farm by farmers.

hunting together. And when the owner shot his first duck, he sent the dog out after it. The dog walked lightly upon the water, retrieved the duck, and walked back to deposit the bird at his master's feet.

"Notice anything?" asked the master expectantly.

"Sure," answered the friend. "That crazy dog of yours can't swim!" *Holly Agricultural News*

★ ★ ★

A woman marched into a poultry shop to complain, "That chicken you sold me yesterday had no wishbone." But the poultryman was equal to the occasion.

"Madam," he declared, "the chickens I sell are so happy they have nothing to wish for."

Mrs. Helen Hester in The Progressive Farmer

★ ★ ★

The girl who thinks no man is good enough for her may be right. Again, she may be left!

★ ★ ★

Wife: A woman who spends the first part of her life looking for a husband and the last part wondering where he is.

★ ★ ★

Back in the days when the West was really the West, a New York lawyer was invited to address a meeting in a cattle town. The speech was obviously a failure, and at its conclusion he was alarmed to see three grim-faced cattlemen, equipped with guns and lassos, headed for the speaker's table.

An elderly man, seated nearby, tapped the Easterner on the shoulder. "Jest set still, son. They ain't nobody gonna harm you. Them fellers is a-comin' for the program chairman."

Arkansas Valley Journal

★ ★ ★

The mother was briefing her young daughter who was about to return a little friend's call. "If they ask you to stay for dinner," she instructed, "say, 'No, thank you, I have dined.' "

But at the visit, the friend's father said, "Come along, my dear, and have a bite with us."

"No thank you," the little girl replied, "I have already bitten."

Iowa Farm Bureau Spokesman

★ ★ ★

The proud grandmother reported that the new baby had its father's nose and its mother's eyes. "Yes," said the new father, "and if grandpa doesn't stop leaning over the crib he's going to have his teeth."

★ ★ ★

A man came out to install the hillbilly's new TV set. "Now this," he said, pointing to the antenna, "will have to go on the roof."

"It's like I always said, Zeke," said the lady of the house to her husband. "One thing leads to another. Now we have to put a roof on the house."

Cappers Weekly

One cave man to another: "Say what you will, we never had this crazy weather until they started using those bows and arrows."

★ ★ ★

Hank went off carrying a lighted lantern to find his way to the big party. He had a gay evening but was considerably crushed next morning to receive a note from his host, saying: "Dear Hank—If you will bring back my parrot with his cage, I'll give you back your lantern."

The National Grange Monthly

★ ★ ★

If your wife wants to learn to drive—don't stand in her way.

★ ★ ★

Little Johnnie had to stand in the corner at school for putting mud in a little girl's mouth. His mother was horrified when she heard it. "Why in the world," she wanted to know, "did you put mud in Margaret's mouth?"

"Well," said Johnnie, shrugging his shoulders, "it was open."

Farm Store Merchandising

★ ★ ★

Success is relative—the more success, the more relatives.

★ ★ ★

A farmer in West Wales sold a flock of sheep to a drover on whose character he set no great value. Somewhat reluctantly he lent his collie to help drive the sheep to a farm on the other side of the hill, a distance of about fifteen miles by road, giving strict instructions that the dog was to have a good meal at the journey's end and then be commanded clearly to 'go home'. But the drover found the dog so useful that, instead of sending it back, he locked it up, planning to keep it. Eventually it managed to escape, went into the field, sorted out all the sheep that had belonged to its master and drove them home again. —*Mary Jones in The Countryman*

★ ★ ★

Organ Recital—two women discussing their operations.

★ ★ ★

In a corner of his log cabin, the mountaineer struggled with a pencil and a piece of paper. Suddenly he looked up and exclaimed, "Doggone if I ain't learned to write!"

His wife walked over and peered at the lines scribbled on the paper. She asked, "What do it say, Ezra?"

"I don't know," he answered, "I ain't learned to read yet."

—*The Lion*

★ ★ ★

The function of metropolitan expressways is to let people go faster and faster to where they have less and less room for living.

Contributions for this page are welcome. Send your "Fun On The Farm" story to Farmer's Digest, Fort Atkinson, Wisconsin.

Should Milk From Mastitis Treated Cows Be Fed To Calves?

This article answers a timely question . . .

Condensed from Guernsey Breeders' Journal

James R. Varley, D. V. M., The Squibb Institute for Medical Research

THE time honored custom of raising replacement heifers on the dairy farm continues to be practiced in many of the better dairy herds. While the heifer replacement program has been changed, due to the practice of procuring replacements from centers that specialize in this service, select calves from choice stock will continue to be raised at the dairy farm for milking herd replacements.

Good dairymen realize that a calf possessing the essential requirements of a valuable herd addition deserves the best diet and care. Consequently, there is little hesitancy in withholding milk for pail feeding. The calf is started on colostrum from her dam to provide essential antibodies and vitamins, and then given whole milk from her dam or other sources for the first two or three weeks after which a shift to skim milk is made. On the other hand, many dairymen use skim milk, supplemented with special calf diets, at an early age.

Recently, there has been considerable concern and misunderstanding regarding the feeding of milk from cows undergoing antibiotic treatment for mastitis. Very often one quarter of the udder is involved. Milk from the remaining quarters is normal in appearance and in volume. Of course, if two or more quarters are infected, care must be exercised in determining whether the entire supply from that cow is affected to the extent that all milk from the cow is unfit for use in calf feeding.

Two questions arise: First, is the milk from apparently normal quarters suitable for calves? Second, should any of the milk from the treated cow be fed to calves?

The first question is one that requires proper consideration and judgment on the part of the dairyman. We are inclined to be-

Reprinted by permission from Guernsey Breeders' Journal, Petersborough, New Hampshire

lieve that no harm can result from the feeding of milk from apparently non-infected quarters providing the cow is not suffering from a severe toxemia. No intelligent dairyman should even consider the use of milk from a cow that was undergoing more than the usual treatment for a case of mastitis; for instance a cow that was receiving other intensive drug treatment in addition to antibiotics, or a cow that was suffering from some additional ailment requiring extensive medication.

In regard to the second question federal regulations make it explicitly clear that the milk in question shall not be used for human consumption until at least

Accurate farm records are going to be more important than ever in 1961.

72 hours after the last treatment. No regulation stipulates that the milk must be discarded. The regulation is designed specifically to protect the public from possible consumption of milk that might contain sufficient antibiotic to bring about sensitization.

Why should this same precaution not be considered in the case of calves that are being fed milk from two or more obviously nonfected quarters? The answer is quite clear in the fact that a great many of the popular calf feeds contain antibiotics, added for the explicit purpose of aiding in the control of such infections as white scours. The remote possibility that the infinitesimal amount of residue that may be present in the milk might be harmful, is not at all consistent with the knowledge that measured amounts of antibiotics are regularly incorated in many calf starters and calf feeds.

There are some very important precautions to be taken in pail feeding of calves. As all dairymen know, colostrum is most important in the first feedings, and no calf should ever be deprived of its use. Generally, a calf is allowed to nurse for a short time after birth, and in many cases this is the only nursing allowed. The calf is immediately removed from the mother and pail feeding is started within 12 hours. Milk for the first day and, preferably longer, should be from the mother's supply. Any surplus need not be wasted if other calves are on pail feeding; colostrum is used to good advantage at any time, and since the well nourished cow will supply an abundance of Vitamin A, as well as other beneficial factors, the milk can be used to advantage. The only possible objection would be if the cow was a very high fat producer; in such an instance add water to the milk so

there will not be a temporary digestive upset.

The amount of milk for the first day should not exceed six pounds for the average calf; it is best divided into two feedings. This is gradually increased until at the age of about three weeks a thrifty calf should consume approximately one pound of milk per 10 pounds of body weight daily, divided into either two or three feedings. Some dairymen find it most practical to space calf feeding to correspond with milking periods, not only for convenience but also the availability of warm, fresh milk.

If calves are changed to skim milk after the first three weeks, there is usually no difficulty in feeding or digestability providing the milk is warmed slightly for the first two days, or mixed with whole milk for a few feedings. The amount of skim milk should be increased about 50 per cent over the whole milk diet, and in addition there should be a good grain ration or calf supplement made available. Calves should be accustomed to a small amount of grain and clean hay by the time they are put on the skim milk ration; by so doing there is less danger of a setback that might result in a sudden change from whole to skimmed milk.

Cleanliness is paramount in every angle of calf feeding. Pails should be cleaned thoroughly (preferably scalded) between feedings; grain boxes must be cleaned regularly to prevent the accumulation of moist grain and subsequent molds. Calves will do very well on ground floors if they are dry and covered with dry straw, shavings or any of the standard litters.

Calves should be penned separately if at all possible. This will not only be a precaution against some of the calfhood diseases, but it will also prevent the sucking of ears or udders after feeding. Where separate pens cannot be provided, inexpensive stanchions will serve to keep the calves separated at least for a half hour or more after pail feeding. Having access to clean hay immediately after pail feeding also tends to prevent sucking. This habit of sucking may lead to self sucking even at maturity, but perhaps the greater danger is the possibility of an udder deformity or mastitis occurring at the time of first calving. The streak canal, even in the developing heifer, is quite susceptible to infection which remains latent until the first gestation.

With tight money in 1960, it will pay farmers to shop around for credit.

In times when the procurement

of suitable replacement heifers for milking herds is such an important facet of the industry, dairymen must take advantage of every opportunity to accomplish this and with a minimum of investment consistent with the goal of developing the best possible milk producers. One of the problems is providing a high grade feed for the developing heifer, and the use of raw milk as the basic diet during the first four months of age is paramount.

Make Fence Posts Last Longer

Years ago fence posts lasted longer than they do now. The reason, according to E. J. Lott, Purdue University extension forester, is that "old timers" split their posts and rails from old trees which had a high percentage of heartwood (hard, central part of the trunk).

The durability of posts. Lott says, depends a lot on the percentage of heartwood they contain. The more heartwood, the longer the posts last. Posts made of Osage orange, for example, may last 40 years or more. Black Locust posts often last 30 to 35 years. Red Cedar and Mulberry last from 25 to 30 years and White Cedar, Catalpa and White Oak last from 12 to 20 years.

Heartwood doesn't increase durability, however, when it comes to posts treated with preservatives, according to Lott. In fact, just the opposite is true. Posts and timbers with wide bands of "sapwood" (soft, fast-growing wood) absorb larger quantities of preservatives than those with much heartwood.

Well-seasoned sap pine posts or any native sap woods, with bark removed, are satisfactory for preserving treatments. Pressure treatments are most satisfactory, he points out, and can increase durability from 25 to 30 years. Such treatments force chemicals into the wood under pressure.

Cold soaking treatments can increase the life of posts from 15 to 20 years, according to Lott. Posts which are to be cold soaked should be peeled first and properly seasoned. *Purdue University*

The value of manure on live stock farms, and its approximate value in terms of commercial fertilizer, can be figured as follows: One beef animal annually produces 6 tons of manure worth $21.42; one dairy cow 7 tons worth $18.06; one hog .5 ton worth $1.29; one sheep .5 ton worth $2.89 and 100 chickens 1.5 tons of manure worth $15.

Silage In The Dairy Feeding Program

General recommendations based on work at the Ohio Agricultural Experiment Station . . .

Condensed from Feed Age

Dr. H. R. Conrad and *Dr. J. W. Hibbs,*

Ohio Agricultural Experiment Station

WITH supplementation of dairy feeds dependent upon types and qualities of silage, a management problem arises as to how adjustments in ration can be made without decreasing milk production.

Meadow crops silages are, by their very nature, highly variable in feeding value. They fluctuate from meadow to meadow because of differences in maturity of forage plants, kinds of plants, and the end products produced by the fermentation. Corn silage is a more uniform crop with respect to feeding value.

Nevertheless, meadow crop silage has proved to be a desirable roughage for dairy cows. Because of improved harvesting methods, it offers a good way to preserve the early forage crop in many areas where weather conditions are unfavorable for hay making.

The highly variable feeding value of forage crop silage makes it more difficult to supplement. By the same token rules-of-thumb for feeding grain and feed composition tables are often inadequate standards to use as guideposts for obtaining maximum feed intake and milk production with forage crop silage. It is important that dairymen have more facts about silages, particularly legume-grass silages, in order to devise an adequate supplement formula. In consideration for the need of additional information several winter feeding trials conducted at the Ohio Agricultural Experiment Station have been directed at studying the problems of forage-crop silage utilization.

Corn and forage-crop silage are vastly different in nutrient content. Forage crops are usually cut at a time when they are relatively high in protein content. Our results show most of them ranging from 13-19 percent total crude protein. It is well known that grain supplementation is needed to take full advantage of this crude protein of forage silage.

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TABLE 1

PROTEIN UTILIZATION FOR MILK PRODUCTION IN DAIY COWS FED LEGUME-GRASS SILAGE WITH DIFFERENT LEVELS OF GRAIN.

Rations	Protein content %	Protein digested %	Protein in milk (g./d.)
Silage + grain	13.3	58.6	311
Silage (corn and cob meal)	11.5	58.2	212
Silage	12.0	61.6	184
Silage + grain	12.9	70.4	323

TABLE 2

EFFICIENCY OF NITROGEN UTILIZATION IN DAIRY COWS FED FRESHLY CUT OR ENSILED LEGUME-GRASS FORAGE WITH DIFFERENT AMOUNTS OF GRAIN

Amount of grain fed	Fresh forage (% intake nitrogen	Silage used)*
No grain	28.7	20.7
One-half grain	36.1	27.6
Full grain	33.9	28.8

*Percentage of intake used for milk protein and tissue storage.

TABLE 3

DIGESTION AND PROTEIN UTILIZATION BY DAIRY COWS FED UNWILTED AND WILTED SILAGE OR HAY FROM THE SAME MEADOW CROP.

No. of Trials	Roughage	Digested D. M. (%)	Protein (%)	Efficiency for milk production* (%)
	Unwilted Silage			
5	Meadow crop silage	66.2	66.7	35.1
4	Meadow crop hay	67.2	65.6	34.2
	Wilted Silage			
2	Meadow crop silage	62.5	56.4	37.4
2	Meadow crop hay	65.6	69.9	31.5

*Efficiency for milk production equals milk nitrogen divided by absorbed nitrogen.

A common observation in nutrition is that the use of protein by the body for building new protein in milk and tissue is dependent on an animal's energy intake.

Thus, in order to take full advantage of protein in grass-legume silage, it must be supplemented liberally with high energy feeds such as corn, oats or barley. This is shown by the data in Table 1. In this test two cows being fed grass-legume silage and grain were fed the same forage crop, ensiled with and without corn and cob meal, in a reversal type experiment. For a final trial period grain was re-added to the ration.

Furthermore, grass-legume silage also contains a high proportion of this protein as non-protein nitrogen compounds, largely the result of fermentation in the silo. Before these compounds can become useful to cattle they must first be converted into protein by rumen microorganisms. Again, a source of readily available energy such as the starch of grains is required for this process. Furthermore, the non-protein fraction resulting from fermentation is generally used less efficiently at higher levels of protein feeding. That this may be a major factor with legume silages is indicated by the data in Table 2, which shows that the nitrogen of freshly cut forage was consistently used with greater efficiency than forage crop silage, despite the fact that the green forage was slightly higher in protein.

In contrast, corn silage which is low in digestible protein, must be supplemented with a protein concentrate containing a large amount of digestible protein in order to take greatest advantage of the energy provided. Among the commonly available concentrates, cottonseed, linseed and soybean oil meal have been found particularly efficient for this purpose. They are high in digestible protein and usually pass through the rumen with a minimum of breakdown and thereby avoid the loss of nitrogen incident to rapid protein breakdown in the rumen.

Sudden changes in the ration of dairy cows often result in serious reduction in daily milk production. The problem is most serious when abrupt shifts have been made from corn silage and hay to a forage-crop silage. In recent years this problem has become more serious because of increased use of forage-crop silage.

Also many farmers are using both meadow-crop and corn silage in the winter. Often both types of silage are stored in the same silo making it difficult to avoid abrupt changes in the kind of roughage fed.

Digestion studies were carried out to help uncover some of the basic causes for reduced milk production when cows are suddenly changed to forage-crop silage.

Good litter management in the brooder house promotes sturdy chick growth. Dry, clean, odorless litter is recommended. It may be chopped straw, shavings, ground corncobs, peat moss, sugar cane pulp, peanut shells, sawdust, or chaff.

These experiments have shown that lowered digestibility can account for the lowered milk production in some cases, but not in others. The experiments also showed that undetermined substances in legume-grass silage may

also be responsible for the reduced milk production. On the other hand high levels of milk production were maintained in cows adapted to legume-grass silage feeding before freshening.

Ration changes initiated during lactation have shown that milk production dropped 10 to 20 percent and then recovered somewhat when cows were shifted abruptly to forage-crop silage from either pasture or corn silage and hay.

In our tests forage crop silage was utilized best when feeding was initiated three to six weeks before freshening and continued through the early months of lactation. It was found also that digestibility decreased and then gradually rose to the expected level during a period of three to four weeks after starting forage crop silage feeding. This lowered digestibility was accompanied by less than maximum roughage intake. It required four to six weeks before some cows reached their highest daily silage intake. Thus reduced milk yields were caused partly by reduced feed intake as well as lowered digestibility.

We know that, when cows are changed abruptly from corn silage to grass silage without an increase in grain to compensate for that lost in corn, they experience a reduction in energy intake and a change in the bacterial population of the rumen. While the rumen bacteria adjust to the change, digestibility of the feed is reduced. Reversing the shift in silage (forage crop to corn) may also affect digestion adversely because of rumen bacterial adjustment.

Also, when corn preserved (150 pounds of corn and cob meal per ton) legume-grass silage was fed following wilted legume-grass silage, digestibility of the roughage intake decreased and so did milk production.

Other important factors affecting milk production have been implicated in abrupt changes of the roughage ration. For example, when rations were fed which eliminated digestibility differences, milk production was still reduced 12 percent when cows were shifted from corn silage and hay to forage crop silage and hay.

Some after-dinner speakers have such endurance that one wonders if they aren't after breakfast, too.

Recent experiments at the Ohio Station indicate that changing from corn silage or hay to grass silage results in changes of thyroid activity. This may be responsible for the decrease in milk production that has been observed.

Other tests showed that the amount of both protein and dry matter digested was usually less for silage than for hay harvested

from the same forage crop. Comparison of digestibilities of two forages— ensiled and barn dried —are shown in Table 3.

Best performance was obtained with early-cut silage which is more digestible. Cows fed early cut forage crop silage in the pre-bloom stage digested 69 percent of the dry matter. Cows fed later cut forage, when alfalfa was in one-fourth to one-half bloom, digested 53 percent of the dry matter.

A farmer's fence isn't the limit of his ground. Beyond the fence is a big market to be worked and harvested.

Thus, in order to help prevent drops in milk production and yet use maximum amounts of forage crop silage, sudden changes in ration should be avoided whenever possible. The following management and feeding suggestions are offered:

1. Adapt the cows to forage crop silage during the month before freshening.

2. Make changes in the amount of supplemental grain fed to compensate for the grain in corn silage when changing to forage crop silage.

3. If possible avoid refilling silos containing grass legume silage with corn silage. If this is necessary use corn and cob meal to preserve the forage crop silage (150 pounds per ton).

4. Use early cut forage for silage making.

5. The digestible protein content of the total ration should be maintained at eight percent or higher when large amounts of forage silage are fed.

6. Certain systems of roughage feeding tend to complement each other and thus reduce the effects of sudden roughage changes. The following suggested systems of changing roughages will help avoid some of the more drastic effects of sudden ration changes: (a.) Green chop or pasture to hay. (b.) Legume grass silage with or without hay throughout the year. (c.) Pasture followed by gradual change to legume grass silage and hay. (d.) Pasture or green chop to corn silage and alfalfa hay. (e.) Pasture to corn silage to corn preserved legume grass silage.

Pruning chores in the spring should include young fruit trees as well as bearing trees. Careful pruning helps shape the tree— gives it balance and strong well-placed branches.

Test Moisture Content of Your Silage Crops

Simple, inexpensive items are needed to insure having proper moisture in crops at silo-filling time. This method has proven to be the most accurate . . .

Condensed from Missouri Ruralist
George L. Smith

THE most important factor affecting quality of silage is moisture.

Excess moisture in silage may be costing you big money. Crops having a high moisture content when ensiled may cause your silo to leak, may turn quality feed into manure, may damage your silo and cause excess corrosion to automatic feeding equipment.

Highest-quality silage possible is necessary for efficient gains and maximum milk production. You need not ensile high-moisture crops, as the guess-work can be eliminated by use of simple moisture-testing equipment suitable for any farmer to use, says Bruce Clevenger, representative of the Dodson Manufacturing Company, Wichita, Kan.

As a part of the continuing research and development program of the Dodson firm, he investigated the relation of moisture to quality of silage crops and has compiled accurate and simple instructions to aid farmers in determining moisture content of crops. The oil distillation method of testing is used, and although this method is not new, Mr. Clevenger has developed testing instructions and simplified the method for on-the-farm testing.

Gathered Much Information

He says, "we knew there was an intimate relationshi p between the quality of silage produced and moisture content, and we also knew there were tests available for determining moisture of forage crops." Many of the methods were inaccurate, expensive or impractical for farm use so it was necessary to gather additional information. He contacted many

Reprinted by permission from Missouri Ruralist, Fayette, Missouri

agricultural specialists at universities, research centers and experiment stations thruout the nation and says, "I got reams of information."

Alvin G. Law, professor of agronomy, Washington State College, told Mr. Clevenger, "There is no crop in American more subject to variations in quality than silage. There are silages put up at proper state of maturity, correct moisture content and proper length of cut to permit good packing that are worth as much as $10 a ton. There still is too much silage of which, if you paid a dollar a ton and hauled it five miles home, you paid too much."

Howard Voelker, dairy husbandry department, South Dakota State College, told Mr. Clevenger, "We feel that moisture content is extremely important in the type of silage that will be produced. Our observations on many determinations of carotene indicate that carotene in alfalfa silage was more than three times as high in alfalfa silage at 60 to 65 percent moisture than alfalfa silage at 70 to 73.8 percent."

Weeds often reduce pasture yields by 50 percent. They compete with the desirable plants for plant nutrients, moisture and light. They lower hay quality, harbor insects and diseases and increase labor and equipment costs.

Mr. Clevenger says if the moisture content is too high when a crop is ensiled, very poor silage may result; some of it not much better than manure and not a very good grade of manure at that. Also, if moisture content is too low, part of the nutrients may be lost thru heating and moulding.

Another hazard sometimes encountered with high-moisture silage is the high acid content which will cause excess corrosion and wear on automatic feeding equipment. An automatic installation may not operate properly on ragged-cut, soggy silage. Also, power and labor requirements to cut, haul and ensile excess water are much greater than if the crop is in proper condition.

Cost of repairing damage to soils resulting from high-acid silage is important but is very small compared with the loss of feeding value, says Mr. Clevenger. After checking out the various methods of moisture testing, he decided the "oil distillation method" was most accurate and practical. Martin Decker, agricultural engineer at Kansas State University says, "This method is the most accurate, quick and efficient way of testing on the farm. It can be used for forage crops, small grains, hays and grasses."

Equipment used consists of: 1

—an accurate dial spring scale with a capacity of 500 grams, 2—a thermometer that will read to 300° F., 3—a tall, 1-quart container, and 4—a supply of cooking oil.

Here Is Procedure

The procedure followed in running a test is to place 100 grams of feed (representative of the field) in 200 grams of oil. The container, with the thermometer inserted, is placed on the stove and heated until the temperature of the oil reaches 293° F. Temperature is maintained between 250° F. and 280° F. for 5 minutes or until bubbling has ceased. Heated oil drives off moisture, and when all moisture has been removed, the thermometer is taken out and the container, with its contents, is placed on the scale and re-weighed. Loss in weight in grams represents the percent moisture content of the green feed.

Mr. Clevenger says, "In a way, we consider the tester as important to a silo as rods, the chute or the ladder. The farmer no longer has a problem of leaky silos and he gets much better quality silage if he has put it up at the proper moisture.

Graphite Coated Seed Speeds Corn Growing

Graphite sprinkled on seed-corn has resulted in more uniform spreading due to its lubricating action in seeding machines. This unique use of graphite was revealed in an announcement by The United States Graphite Company.

There has always been the problem of seed, especially when it has been treated with insecticide, sticking together or to parts of the seeding machine. This has resulted in wasteful and non-uniform plantings. Now, with graphite lubrication, the seeds do not adhere to each other or the machine, and uniform feedings is attained.

Dry graphite, ground to about 200 mesh screen size, is sprinkled on the seed prior to spreading. The seeds become uniformly coated, and have a dark grayish color. The dark color, it is claimed, offers the additional advantages of faster germination, and less waste, since crows are not attracted by the coated seeds.

—The United States Graphite Company

Catfish Farming

Two farmers who know about "proper land use" start practicing "proper water use" . . .

Condensed from Soil Conservation
Brice M. Latham

TWO farmers in Abbeville County, S. C., can furnish firsthand information about catfish farming.

They are W. M. Agnew, of Donalds, and C. W. McIlwain, of Abbeville, who tried this new type of farming operation for the first time this year. Both men had stockwater ponds on their farms but had never before thought of "farming the water".

The ponds were stocked on March 17, at a rate of 1,500 speckled bullhead catfish fingerlings (weighing about 50 to the pound) per acre. After stocking, the ponds were fertilized with 40 pounds of 10-20-5 fertilizer. Feeding was begun April 18, at the rate of 2½ pounds of 36-percent protein hog supplement in pellet form. Food was put in every two to three days thereafter.

In October, the ponds were drained and the fish harvested with a 1½-inch mesh seine. When the net was pulled through the Agnew pond for the first time about 250 pounds of splashing catfish were pulled out.

Agnew harvested 450 pounds of fish from his ½-acre pond and the 0.8-acre McIlwain pond yielded 485 pounds. The largest fish weighed in at 1 pound and 1 ounce; the average weight was approximately 10 ounces. Most of the fish were sold to neighbors at 35c per pound "on the fin" or 55c per pound dressed. The flavor was excellent.

In addition to the edible fish harvested, the ponds were alive with fingerling catfish. Many of these were sold to neighbors who wanted to stock their ponds and begin "farming their waters." Agnew and McIlwain restocked their ponds and plan to harvest the next crop of fish in June.

Since this was the first time catfish had been grown on hog feed in this section, complete records were kept of all expenses. For the

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Agnew pond, the cash return for the pond and labor was $90; McIlwain netted $143 from his pond.

McIlwain had this to say: "I already knew the importance of proper land use; now I am going to have to start thinking about proper water use, too. I have restocked my pond and am looking forward to another harvest next June. There are still some 'bugs' to be worked out in management; but I can see the potential of two catfish crops per year."

Minimum Tillage Cuts Planting Costs, Boosts Yields

HIGHER yields and less field work! They're Douglas Goodrich's reasons for using minimum tillage.

At New Richmond, Wis., near the Corn Belt's northern edge, the practice has produced over 100 bushels of corn an acre on the 400 acres Goodrich usually grows; has regularly topped good yields grown before 1958 when he switched from conventional tillage to wheel-track planting.

Using minimum-tillage, Goodrich prefers to plant the same day land is plowed, so he swaps field work with neighbors. The payoff, he says, is higher yields because of quicker germination and much better and stronger stands. Seed is planted in soil firmed by the tractor's wheels. Goodrich adds: "This leaves between-row soil loose to slow weed germination, soak in rainfall, and cut erosion."

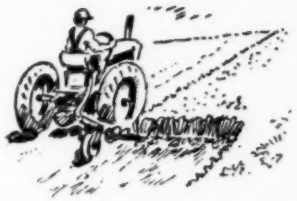
Goodrich rotates corn, oats and a legume-brome mixture. He supplements the crop-producing nutrients of well-manured land by fertilizing as tests show need. Broadcast application precedes plowing, then he accompanies planting and cultivating with a starter and sidedressing.

He plants adapted hybrids treated for kernel and seedling protection, spacing rows 40 inches for 16,000 stalks per acre. Preemergent spray, applied over rows while planting, helps control weeds.

Goodrich's main caution about minimum-tillage is: "Be sure quackgrass is controlled before planting." He's had success with intensive fall cultivation on fields where corn's to go next spring and from spraying quack's spring growth with dalapon.

The Furrow

Improved Ways To Seed Grass



Two new successes are band seeding and sowing grass, legumes with corn . . .

Condensed from Prairie Farmer

NEW seeding techniques, machines, tillage, and cultural practices, plus a better knowledge of the use of commercial fertilizers are each a part in reducing the chances of failure a farmer takes when he sows grasses or legumes.

In past years grasses and legumes were sown for the most part with either oats, wheat, or barley as a nurse crop. They still are but under new seeding conditions. Seedlings were seldom made alone, particularly in the spring, for the grass or legume seedling just couldn't stand the weed competition.

Band seeding is one of the newer methods of seeding legumes and grasses, either alone or with a grain nurse crop.

When seed and grain are sown together this way, the seed is dropped on the soil surface about 12 inches behind the grain, which is drilled 1 to 1½ inches deep. The drill-disk furrow closes over grain and fertilizer before the seed falls on the ground. Culti-packing after seeding or the covering effect of rains makes a shallow seed covering. Covering chains should be removed because they scatter the seed. Some drills have packer attachments.

This method of seeding is not recommended for spring seeding in wheat. Use of the conventional grain drill arrangement, with the legume falling through the fertilizer grain outlet into the disk furrow, is more satisfactory for establishing the seeding.

Band seeding gives stronger stands with less seed than broadcasting. Results from several experiment stations on several types of soil show that seeding rates may be reduced as much as 20 percent if legumes and grasses are band-seeded instead of broadcasted.

Shot In The Arm

Since all the seed is over the fertilizer row when legumes are band-seeded, the small seedling gets a "shot in the arm" from

Reprinted by permission from Prairie Farmer, 1230 Washington Boulevard, Chicago 7, Illinois

the fertilizer phosphorus within two weeks after germination. The resulting rapid early growth helps the legume to withstand the hazards of drouth and insects, or competition from weeds and nurse crops.

Band seeding assures a shallower seed placement and quicker use of fertilizer by the growing seedling, but it isn't a cure-all. Lime, fertilizer, weed control, and a good seedbed are all essential for good seedings.

On the market today are conversion kits that can be attached to drills. They cost from approximately $5 to $10 and can be attached to a drill in a short time. An ingenious farmer can convert his own drill for band seeding.

M. B. Tesar, farm crops researcher at Michigan State University, advises cultipacking after seedings for shallow seed coverage, but this isn't necessary in early spring because rains generally do a good job.

If the soil is heavy, Tesar says it might not be advisable to cultipack. Seedings made in late summer should be cultipacked to get shallow seed coverage and to make moisture available to the seedings.

Another new wrinkle to better grass and legume seedings is making the same in corn. Farmers for years have broadcasted or drilled rye and sweet clover in corn for cover crops. Such seedings have been quite successful, depending on moisture conditions.

Research work has showed that clover, alfalfa, and grasses could be successfully sowed in corn if certain conditions were met.

One of the conditions was a wider corn row instead of the regular 40 or 42-inch row. Increasing corn rows to 60 or 80 inches has produced a 10 to 64 percent better stand of legumes in Michigan experiments.

Stands in the wide corn rows were as good or better than seedings made in oats, while stands in 40-inch rows were poor or spotty. Narrow corn rows furnish too much competition from a water and light standpoint.

Alfalfa seeded in 60 to 80-inch corn rows produced 3.3 tons of hay per acre which was as much as produced in oat seedings. Poor stands in 40-inch corn rows produced less than 2 tons.

Getting the sprayer ready for spring use is imperative. Replace lost nozzles, broken or damaged hoses and make other needed repairs. On a warm day calibrate the sprayer for accuracy.

What about corn yields when wider rows are used? Yields in Michigan and in other states show drops of about 40 percent when 60-inch rows are used and more in an 80-inch row. But checks of

corn and oat yields show that more grain and roughage as silage can be produced in the cornfields with the wider rows than in comparable acreage of oats.

One way the farmer can increase his corn yield under these conditions is to be sure he gets about 16,000 corn plants per acre. This means a corn plant every 5 to 6½ inches in the 60-inch row and every 4½ inches in the 80-inch row.

When legumes and grasses are seeded in either the 60 or 80-inch row, the seeding is done after the second cultivation of corn, generally between June 15 and June 25. At this time there are generally showers which help to insure success in such seeding operations.

Seeding should be made by the band methods using the farm grain drill with band, fertilizer, and packing attachments if possible.

The seeding parts of the drill are removed to make way for the corn row. If the drill doesn't have packers, the rows can be cultipacked. Packers for drills can be purchased for about $100 and easily attached as a part of the drill.

Tesar recommends that from 300 to 500 pounds per acre of a 0-20-20 or 0-20-10 fertilizer be applied at the time the seedings are made.

If the farm is rolling or hilly it might be best to make the seedings in oats in the spring, using band methods of seeding.

What Width Corn Row

Which width of corn spacing should be used? This you have to decide yourself. The width might be influenced by the tools you have. The 60-inch row will yield more corn, have fewer weeds, but have a wider blank space where the corn row was. In an 80-inch row there will be less corn and a smaller loss of seeded area in the corn row.

Seedlings made in corn are more difficult in dry weather than those made in oats. One of the problems in making seedings in corn is the matter of stalks. If the corn is made into ensilage, there is little stalk trouble. If the corn is picked and the stalks left, there is a problem.

Calves and yearlings are more susceptible to warts than older cattle. These virus-caused growths usually disappear naturally as the animals mature.

The stalks can be shredded and left on the ground or taken to the barns and used for bedding. If the stalks are left in the field after picking, it means some trouble when haying time comes.

The first cutting of hay can be pastured or the hay and stalks cut and put into the silo. Stalks with alfalfa make a poorer grade of hay. Generally after the first cutting of hay the stalks are of little trouble.

After Wheat Harvest

Another seeding practice that is not new but is getting some attention in Michigan is the seeding of legumes and grasses after wheat harvest. Plow the ground as soon as possible after the wheat is cut. Prepare a good seedbed and band sow the legumes and grasses.

Use a commercial fertilizer with the seedings. If the drill doesn't have packers, cultipack the soil. With some moisture such seedings can be successful. Do the job before Aug. 25. The earlier the better.

Machinery companies are taking an interest in band seedings and are making new drills or accessories to older drills that will permit making seedings under the new ways.

The extensive use of winter barley makes a good medium in which to spring-seed legumes and grasses with the barley as nurse crop. Legumes seeded in this crop have a good chance of survival. Barley is the first grain crop to be harvested. With weeds under control, the legume and grass seedling has a good chance of survival.

Yeast For Dairy Cattle?

Will feeding yeast to dairy cattle increase milk or fat production? W. S. Griffith, dairy specialist at Virginia Polytechnic Institute, says conflicting research reports have shown that in some cases fat test of milk was increased by as much as 0.8 percent by feeding yeast, while other reports show negative results.

Oklahoma State University scientists found that neither the total production of milk nor the fat test was significantly affected by adding dried yeast to the ration.

What does this mean to dairymen? Griffith says it means that adding yeast to the ration of milking cows to increase milk production is not a sound practice. Experimental data fails to show any benefit, so money spent for yeast could better be spent on other feed, Griffith says. *—Virginia Polytechnic Institute*

Sound Nutrition Ensures Better Quality Wool

Wool production and proper nutrition are closely related . . .

Condensed from
Farming In South Africa

Dr. P. J. Cronje, Stellenbosch-Elsenburg College of Agriculture

IT IS a well-known fact that nutrition plays an important part in the production of wool.

Prospective buyers of breeding sheep should bear in mind that, when buying sheep from other regions, selection for wool characteristics should be based on the nutritional level of animals. It has been established that the wool of sheep which are kept at a high nutritional level and which have strong wool, becomes fine when they are moved to regions with poorer grazing.

Nutrition is also an important factor in the determination of wool characteristics. The genetic potential, that is the hereditary characters of an animal, cannot be changed, but factors such as nutrition, climate and disease will determine whether that potential can be maintained. It is therefore essential, when selecting on outward appearance, that attention also be given to the controlling factors, otherwise selection will be highly ineffective.

To a large extent, nutrition determines the length, thickness, tensile strength and crimp formation of wool fibers, as well as the quantity, quality and color of the wool grease.

Quantity

An adequate quantity of a well-balanced ration promotes longer, thicker and healthier wool fibers, and consequently increases the total quantity of wool. It also insures sufficient wool grease of good quality. Malnutrition, on the other hand, results in short, thin and weak fibers.

As the wool grease produced under poor nutritional conditions may be inadequate and of a poor quality, the fibers will weather more easily as a result of the increased penetration of moisture and other impurities. Where nu-

Reprinted by permission from
Farming in South Africa, Department of Agriculture, Pretoria, South Africa

tritional conditions are poor, the fibers will become so thin that they break easily (tender wool) and where nutritional conditions are extremely poor, sheep will lose their wool.

Generally speaking, the wool production of under-nourished full-grown sheep will reach its normal level as soon as adequate feed is available. Where, however, sheep up to the age of 18 months are subjected to poor nutritional conditions, their wool production capacity may be permanently impaired. The reason is that at that age (18 months) follicles are still being formed under optimal conditions. Where nutrition is poor, however the forming of follicles will be affected adversely and wool production will suffer permanently.

How To Produce Top Quality Beef

How to produce lots of top quality beef, using plenty of pasture and a minimum of grain, is a problem of some magnitude for cattlemen.

Ways of doing it efficiently are being investigated at the Southwest Virginia Research Station at Glade Spring. Tests on production of yearling slaughter steers, using mainly pasture and roughage with a minimum of grain, have been in progress at Glade Spring since 1955.

Researchers say their tests have pointed to the following conclusions:

Heavy steer calves averaging 475 to 525 pounds at weaning, wintered to make one pound or more gain per day, grazed on good quality pasture, and fed 15 to 20 bushels of corn on pasture for the last half of the grazing season, may be expected to produce Good grade carcasses, dressing around 58 percent, and which are of desirable 'handy weights' (900 to 1,000 pounds) as yearlings by early October.

Yearling steers fed grain on pasture for the last half of the grazing season, and full fed for 60 days in the dry lot after the pasture season, should produce low Choice carcasses with 59 to 60 percent dressing. Similar steers not fed grain on pasture need about 120 days in the feed lot to reach comparable weights and grades.

A ¾ pound per day winter gain seems enough for steers to be grazed on pasture and finished in the dry lot on full feed for 120 days or longer.

—Virginia Polytechnic Institute Agricultural Newsletter

Stretch Your Seed $'s

Be sure of the pure live seed content of what you buy . . .

Condensed from Nebraska Farmer

Don Burzlaff, University of Nebraska

ONE of the keys to successf ıl grass and legume seeding is the selection of high quality seed.

Seed lots vary widely in quality and price. This is especially true of that seed that has been harvested from native meadows and pastures. Because of differences in harvesting and storage methods this variation is found also in commercially produced seed. Some lots of seed will contain large amounts of inert matter or foreign seeds. Others will have seeds that will not germinate. Many lots of seed, of course, possess both low purity and low germination.

Only live seeds of the desired crop are of value to the farmer or rancher who plans to use them in a seeding program. The percentage of live seeds in a seedlot indicates its pure live seed content. Among seedsmen and agronomists, the pure live seed content of a lot of seed is referred to as its PLS content. The PLS of any seed lot is determined by multiplying the percent purity times the percent germination.

Information on germination and purity is required by law on all lots of seed offered for sale. Certified seed producers are noted for production and marketing of high quality seed. The use of certified seed of recommended varieties of grasses and legumes is a sound practice.

Read the seed tag. The following example shows how to use it as your guide to the best seed buy.

Seed lot A

Purity 40%
Germination 45%
PLS (40% x 45%) 18%
Price per lb. 60

Seed lot B

Purity 60%
Germination 60%
PLS (60% x 60%) 36%
Price per lb. 85

Which lot of seed represents the best seed buy for you? Here is the formula that helps you to decide:

Reprinted by permission from Nebraska Farmer, 1420 P Street, Lincoln 1, Nebraska

Quoted price per pound divided by Purity X germination (PLS) equals Price per pound of pure live seed.

This is the way the formula works in the case of the two lots of seed shown above.

Lot A

.60 (price) divided by .40 x .45 (.18) equals $3.33 per lb. of PLS.

Lot B

.85 (price) divided by .60 x .60 (.36) equals $2.36 per lb. of PLS.

Even though lot A above sells for a lower price per pound, you actually save $.97 per pound of pure live seed when you buy lot B. If 100 pounds of pure live seed were needed to make a grass seeding, it would require the purchase of 550 pounds of lot A compared to 275 pounds of lot B.

The moral of the story: Low quality seed is NO bargain.

Putting grass seed purchases and planting on a PLS basis has advantages for all.

Benefits to the Farmer (who buys and plants grass seed)

1. Gets the most for his seed dollar.
2. Pays only for seed of the variety he wants.
3. Pays only for the seed that will germinate.
4. Gets better stands.
5. Buys and handles less bulk.

Benefits to the Dealer (who buys and sells grass seed)

1. Can give the farmer the most for his seed dollar by pricing seed on the basis of its quality.
2. Can offer seed of uniformly high quality.
3. Buys and handles less bulk.
4. Has less difficulties with seed processing.
5. Will have more satisfied customers.

It Just Doesn't Taste Good

University of Illinois scientists are developing corn that European corn borers won't want to eat. They find corn borers will stuff themselves on certain corn plants, while they may not give the next plant a second glance.

Corn breeders have discovered that corn borer resistance is inherited. They are working to develop inbred lines of corn that will have the ability to resist the corn borer. These resistant inbred lines can then be used to produce a resistant high-yielding hybrid. Corn borers find most of today's hybrids very tasty.

—Illinois News About Agriculture

How To Establish Grass In A Waterway

9 steps to success in this sometimes difficult operation . . .

Condensed from Pennsylvania Farmer

William A. Hayes

GRASS waterways are essential to the safe disposal of water on many farms. An important function is to serve as an outlet for diversion terrace systems.

For this purpose, it is very important that the waterways be established at least one year ahead of the diversion installations. This step-by-step guide may be of some help in the solution to your problem.

Step 1

Construct the waterway at a time favorable for establishment of vegetation in your area. The dimensions should be determined by an experienced technician. After obtaining the desired shape, loosen the hard areas in the channel to a depth of six inches with a chisel, disc plow, or similar tool.

Step 2

Construct a temporary diversion across the beginning of the waterway. Divert this water to a pasture, or other grassed area. If this is not possible, establish a temporary outlet beside the newly constructed waterway. This outlet may range from one or more plow furrows to a pass with a bulldozer. This temporary diversion and outlet will prevent large amounts of water from flowing over the newly seeded area. These temporary structures may wash but will be easily healed over when the water is turned back into the grassed waterway.

Step 3

Apply lime according to soil test.

Step 4

Drill deeply, 1,000 pounds of 0-20-20 fertilizer.

Step 5

Broadcast or drill shallow 600 pounds of 10-10-10 and apply ten tons of manure per acre. Disc the manure, lime and fertilizer into soil, leaving a trashy surface condition but free from clumps of manure. If you do not have manure, substitute one ton of straw per acre and increase the fertilizer to 1,000 pounds of 10-10-10 per acre. A notched disc

Reprinted by permission from Pennsylvania Farmer, Harrisburg, Pennsylvania

will do a good job of cutting the straw in the soil.

Step 6

Broadcast seed immediately after seed-bed preparation and cultipack before the soil surface dries out. Otherwise you may get poor seed and soil contact resulting in low germination and poor establishment. Consult your local soil conservationist for the kind of seed to use. Cultipack up and down the length of the waterway. Working across the waterway guides water to the center of the channel, causing erosion.

Step 7

Control precipitation that falls on the waterway by using one of the following methods:

(a) Apply one and one-half tons of straw per acre. Tie the straw down with poultry or paper netting. This method is used on critical sites.

(b) Plow graded furrows across the waterway on a one per cent grade. Space furrows according to soil and slope conditions. A plow furrow parallel to the waterway and off to one side will provide an adequate out for the graded furrows. If the other side of the waterway is not already protected, a similar furrow should be installed.

Step 8

Broadcast wheat or rye in all the furrows and the temporary diversion to reduce washing.

Step 9

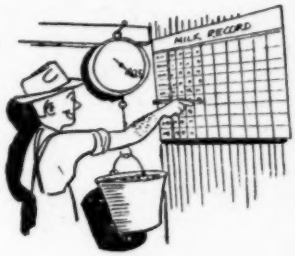
After vegetation is well established in the waterway remove or level the furrows first, then the temporary diversion and its outlet and seed. Spring and early August seedings are usually well established in 10 to 12 weeks. However, late August and early September seedings are usually not well established until the next spring.

Technical guidance in waterway construction and establishment of vegetation is available through the U. S. Soil Conservation Service and your local Soil Conservation District.

Early Lighting Cuts Laying

Lengthening the daylight hours by artificial lighting to increase laying by young hens may actually reduce egg production if the birds are too young when exposed to the extra light. Experiments show that pullets exposed to lengthened days from birth to 20 weeks of age began laying from 7 to 10 days later than similar birds exposed to normal daylight during this period. Over a 51-week test period, the birds that received artificial light too early laid an average of seven to eight fewer eggs. —*Louisiana State University*

Are We Doing Right By Our Cows?



We hear a lot about good breeding but good breeding alone is not enough . . .

Condensed from Milking Shorthorn Journal

WE HAVE spent a good deal of time and money developing and using dairy sires that have a background of high milk production.

The question is: are we cashing in on this improved breeding?

In Australia researchers gathered up a group of calves in three successive years from 20 low producing herds and 20 high producing herds, brought them together for rearing and recording of their first lactations after which they were returned to their original herds.

In a companion trial 40 sets of identical twins calves were divided between the low and high producing farms and milked thru their first lactations.

In all cases the milk yield of the cows regardless of origin tended to reach the same level as the herd in which they were milked. That is differences in milk yield appeared to be due to environment rather than heredity.

Further investigation of differences in management or environment indicated that the most significant factors were 1. level of nutrition, and 2. milking practices.

There are indications in other experimental work here and abroad that the effect of good breeding shows up to a greater extent under a favorable environment.

This adds up to this fact: that we cannot expect to realize the benefits of breeding high production into our herd unless we give the cows a chance, providing the feed, the proper careful handling, and proper milking methods to which the cows will respond.

Breeding can never be ignored; it sets the ceiling of production. The indications are, however, that many herds are operating at levels below their present potential. Ask yourself these questions:

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Milking Shorthorn Journal, 313 South Glenstone Avenue, Springfield, Missouri

1. Am I doing a good job in balancing the ration to meet the needs of cows in my herd?

2. Am I planning ahead on my feed program? Draw up a feed budget for the entire herd. Purchase the needed feed when you can get the desired quality at harvest time.

3. What am I doing to help check that summer shrink in milk production? Feed palatable roughage at night, or provide good night pastures. Provide enough shade and plenty of water.

4. Does my feeding program include silage? It is a hay-saver in times of high hay prices. Silage is a good feed, especially during the winter months.

5. Am I balancing the right kind of concentrate with the type of roughage fed? A 12 percent to 14 percent protein level is sufficient with most roughages, except where the roughage is largely corn or sorghum silage or mature pastures in late summer when it should be 16 percent.

6. Are the cows bred to calve once a year? Next to good cows well fed, no factor is more important to get a good herd average. Fall freshening for a majority of the herd is desirable to balance supply with demand.

7. Am I doing a good job of growing out my heifers? With good feeding they can be bred to freshen several months earlier. They should freshen at 24 months of age, weighing 80 percent of mature weight.

8. Am I using the best bull available? The use of artificial inseminating services may be best for you.

9. Am I keeping the kind of breeding records that will enable me to carry out a better breeding program? Keep freshening dates, heat dates, breeding dates and dry dates in a convenient but permanent record book. Breed at the first heat period after 60 days after calving.

10. Am I using labor efficiently? Make full use of labor and facilities. Design the dairy layout to utilize the labor and equipment efficiently.

11. Am I maintaining a healthy herd? Call a veterinarian before it is too late or contract him on a yearly health control basis.

12. Am I producing a quality product? An efficient sanitation and health program is essential.

13. Am I keeping production records? Without records we work in the dark.

14. Am I doing a good job of milking? Gentle handling; stimulating milk let down; milking machine clean; properly adjusted and in good repair; and prompt removal when the cow is milked out.

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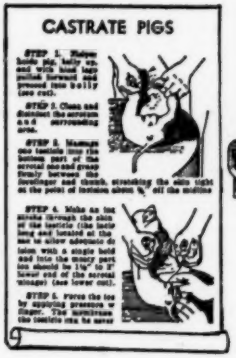

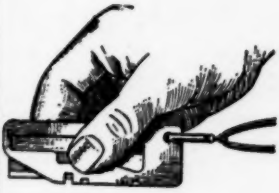

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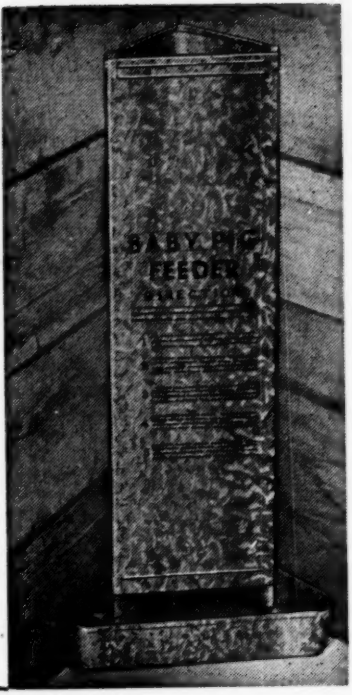

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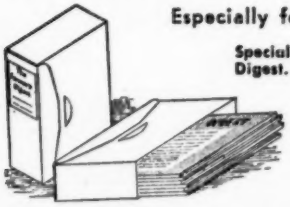

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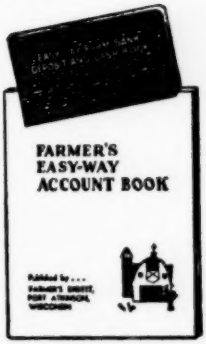

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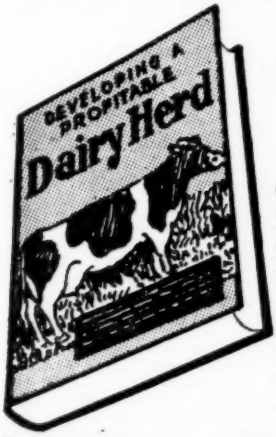

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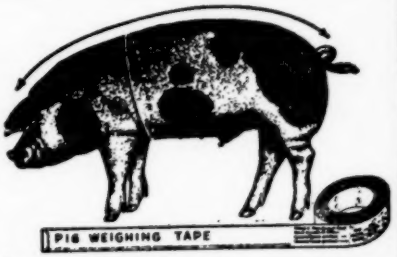

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